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CURRENT METER DATA REPORT FOR MONA PASSAGE.(U)
APR 77 M BOURKLAND, S DOREY
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1 OF 1
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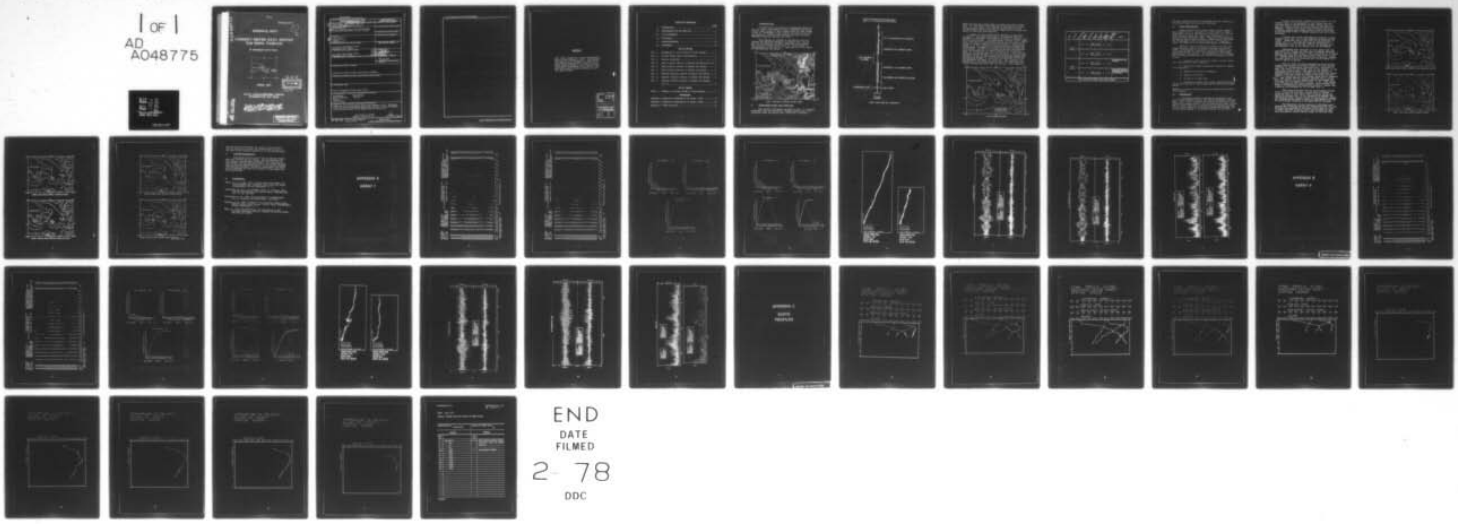

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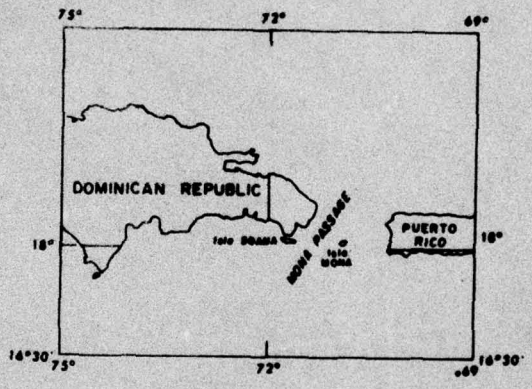
TECHNICAL NOTE

CURRENT METER DATA REPORT FOR MONA PASSAGE

M. Bourkland and S. Dorey



APRIL 1977

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WASHINGTON, D.C. 20373

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REPORT DOCUMENTATION PAGE

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Summarizes current measurements made in Mona Passage in 1975. Bathymetry, sound velocity-salinity-temperature-density profiles, and mean and maximum current velocity vectors at two sample levels are given.

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ABSTRACT

This report summarizes current measurements made in Mona Passage in 1975. The figures included show the bathymetry, location of the current observations, location of the SVSTD stations taken at the time of array implantment (*NAVOCEANO cruise* 343517), and mean and maximum velocity vectors at the two sample levels.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

I. INTRODUCTION

In March 1975, the Physical Oceanography Branch of the U.S. Naval Oceanographic Office implanted taut-lined current meter arrays in Mona Passage from the USNS WILKES (T-AGS 33) (NAVOCEANO cruise 343517) to measure near bottom currents. Recovery was accomplished from the USNS HARKNESS (T-AGS 32) during July 1975.

Mona Passage is located in the Greater Antilles between the Dominican Republic and Puerto Rico, and is part of the Antilles Arc which separates the Caribbean Sea from the Atlantic Ocean (Fig. 1). The Passage is approximately 114 km (62.5 mi.) wide and has a sill depth of approximately 450 meters.

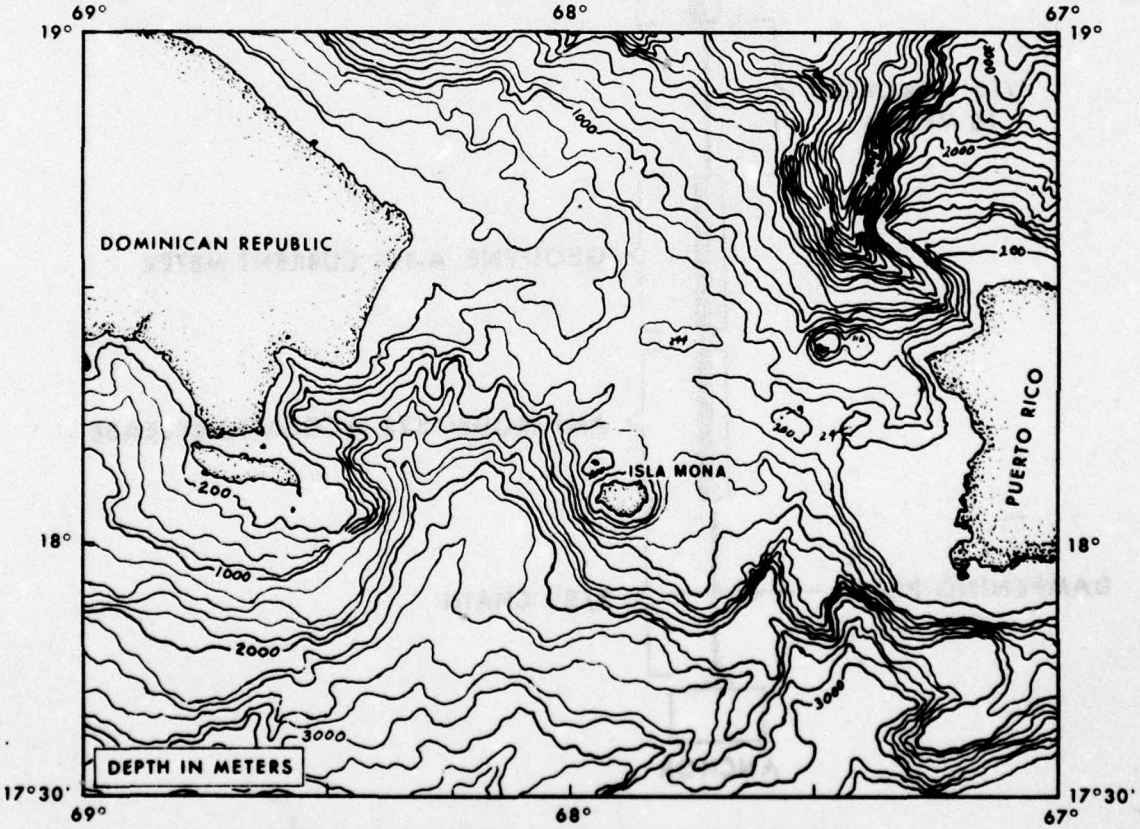

FIGURE 1. BATHYMETRY IN THE VICINITY OF MONA PASSAGE

II. INSTRUMENTATION AND SAMPLING

Five arrays (configured as shown in Fig. 2) utilizing Richardson type current meters (Geodyne model A-101) were implanted using the anchor last "free fall" technique.

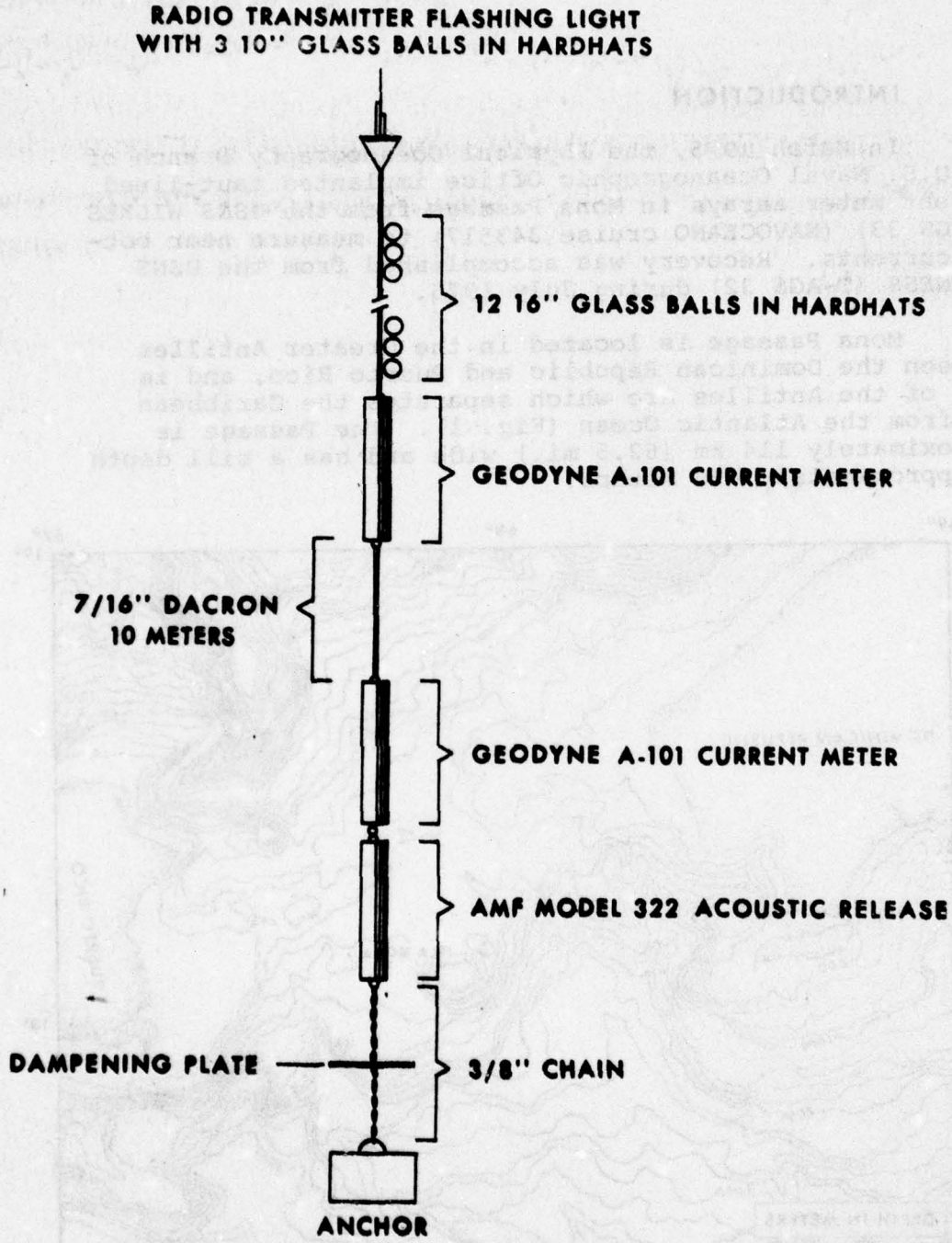

FIGURE 2. CURRENT METER ARRAY CONFIGURATION

SVSTD stations were taken near the array site after launch (Fig. 3). The arrays were deployed by streaming the glass balls, current meter, line, and the release device from the ship before cutting the anchor clump loose, allowing the array to free fall into position.

A summary of the current meter implants is presented in Table 1. The meters on array 1 ran properly from implantment to recovery. Both meters on array 4, however, had partial malfunctions. The speed sensor of meter N-413 stopped after 1098 hours of observation and the film in meter N-429 failed to advance properly after 2318 hours of observation. Arrays 2, 3, and 5 failed to surface when the releases were interrogated. Attempts to recover the arrays by grappling also failed. Failure of the releases may have been attributable to flooding due to excess corrosion on the bottom plate of the release near the 'O' ring seals. Both releases recovered showed excessive corrosion around the purging plug. Corrosion on one of the releases had progressed through the purging plug primary 'O' ring seal and was about 1/8" from the secondary or backup 'O' ring seal. The corrosion was determined to have been caused by a lack of electrical continuity between the anode and the end cap. This condition

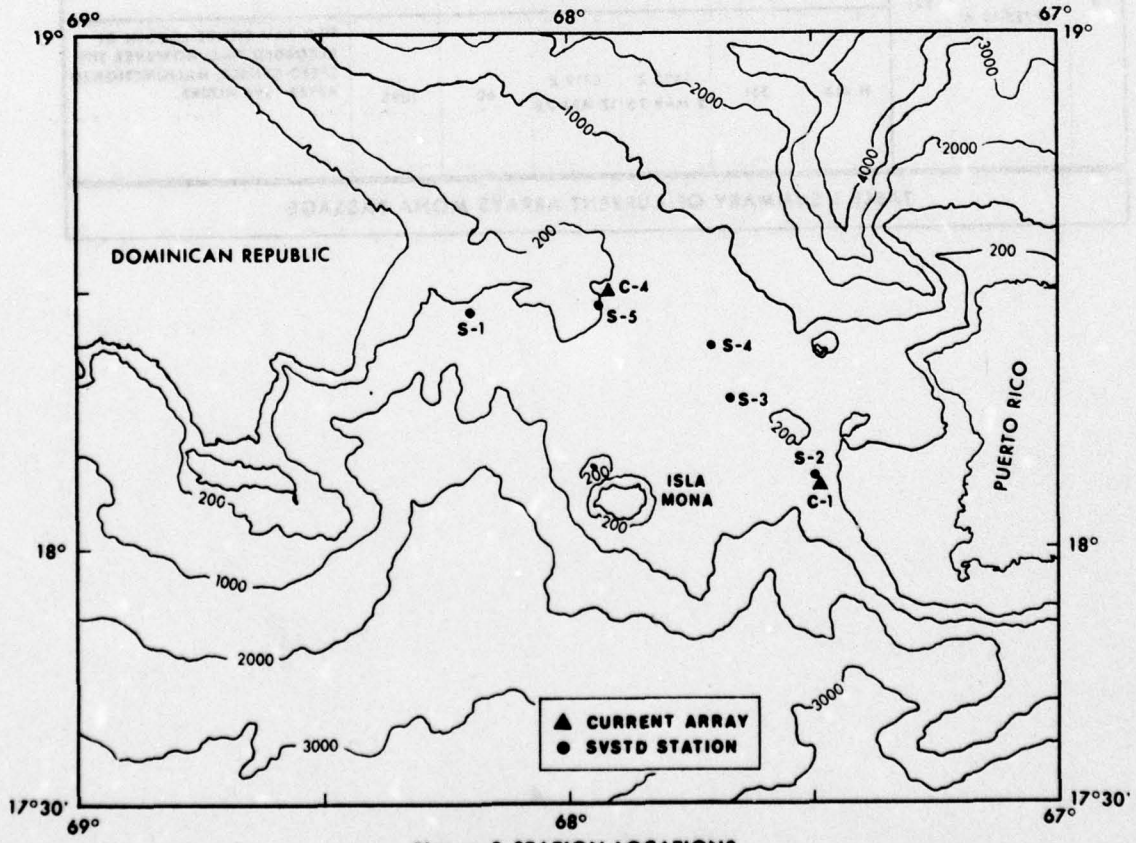

Figure 3 STATION LOCATIONS

ARRAY	POSITION	WATER DEPTH (m)	CURRENT METER S/N	METER DEPTH (m)	METER DATA STARTS	METER DATA ENDS	SAMPLING INTERVAL (MINUTES)	TOTAL USABLE RECORD (HOURS)	REMARKS
1	18°07.08'N 67°29.07'W	405	N 434	385	2025 Z 2 MAR 75	1640 Z 14 JUL 75	60	3212	
			N 128	395	2025 Z 2 MAR 75	1640 Z 14 JUL 75	60	3212	
4	18°30.3'N 67°55.10'W	341	N 429	321	1905 Z 2 MAR 75	0819 Z 7 JUN 75	60	2318	METER MALFUNCTION AFTER 2318 HOURS
			N 413	331	1405 Z 2 MAR 75	0719 Z 17 APR 75	60	1098	FILM RAN ENTIRE LENGTH OF RECORDED TIME; HOWEVER THE SPEED SENSOR MALFUNCTIONED AFTER 1098 HOURS.

TABLE 1 SUMMARY OF CURRENT ARRAYS MONA PASSAGE

has been rectified and all instruments are now checked for continuity before the arrays are launched.

III. DATA PROCESSING

Geodyne model A-101 current meters record compass, vane, speed and tilt information on 100' rolls of 16mm photographic film as described by Richardson, et al (1963). Films recovered from the meters were developed at the Naval Research Laboratory (NRL). They were then processed through an Optical Data Converter (OPDAC) which translates the photographic code to binary data on 1/2" magnetic tape. The OPDAC is an in-house development of NAVOCEANO.

Magnetic tapes created by the OPDAC were then processed through a series of FORTRAN language routines on a UNIVAC 1108 computer to produce a final data tape of current observations from which all statistical and graphic presentations are derived. The appendices A and B contain the following presentations of the data collected on these arrays:

a. Bivariate distribution of speed (4 cm/sec interval) and direction (10^{o} intervals).

b. Cumulative speed distribution (cm/sec vs cumulative frequency).

c. Speed and direction histograms.

d. Speed vs time plot.

e. Ve and Vn vs time plot.

f. Progressive vector plot (shows relative motion during time span as a single particle of water thru a fixed point).

Appendix C contains SVSTD profiles and temperature-salinity (T-S) graphs.

IV. DISCUSSION

A literature search on subsurface currents in the area of Mona Passage reveals that few measurements have been made. Wüst (1964) discusses the general circulation in the Antillean-Caribbean Basins, but not specifically Mona Passage. Wüst's report does show a tendency for the surface currents to flow in a northernly direction through Mona Passage, and that a slight change in circulation occurs in the Fall.

Surface flow charts created for an Atlantic Surface Current Atlas, to be published by this Office show the northern edge of the Caribbean current flowing westerly past the southern shore of Puerto Rico and the Dominican Republic. Some of this water mass bifurcates and flows northward through Mona Passage where it may be entrained by the Antilles Current, thereby resuming its flow to the northwest.

A series of current measurements conducted in Mona Passage in the fall of 1972 are reported by Burns and Car (1975). These data show a mean flow of approximately 14 cm/sec (Fig. 4). The maximum observed currents show a northeasterly flow on the east side of the passage and a southwesterly flow on the western side of the passage.

Subsurface data contained in this report show the northward flow through the east side of passage continues down to the sill depth where it has a mean flow of 10 cm/sec between Mona Isle and the Puerto Rican coast (Figs. 5 and 6). Between Mona Isle and the Dominican Republic, however, the mean bottom flow is southward into the Caribbean at a rate of nearly 20 cm/sec.

Both our data and those presented by Burns and Car suggest there exists a horizontal shear zone that extends northward or northeastward from Mona Isle. According to Wüst, the inflow on the western side of the passage is the subtropical undercurrent. The core of this current is characterized by a salinity maximum near 36.9‰ which occurs between 80 and 200 meters as shown by the SVSTD stations taken in conjunction with the current meter arrays (Appendix C). Near bottom maximum currents observed show a strong flow (40 cm/sec) for the eastern side of the passage and 80 cm/sec for the western side (Figs. 7 & 8). This agrees with the Burns and Car data, although their maximum flow shows a northeasterly-southwesterly direction rather than northerly and southerly as in our data (Fig. 9).

Wüst reports maximum flow of the Caribbean Current to be in June and July and a minimum flow in October. Since the data in this report were collected during the period of maximum flow, it can therefore be assumed that the maximum bottom currents would not significantly exceed the observed 80-85 cm/sec currents on the western side and 40 to 50 cm/sec currents on the east side of the pass.

The definition of the location of the shear zone between the inflowing subtropical undercurrent and the outflow and the magnitude of the shear would require a grid of SVSTD stations extending north and northeast of Mona Isle and several current meters arrays in the grid area

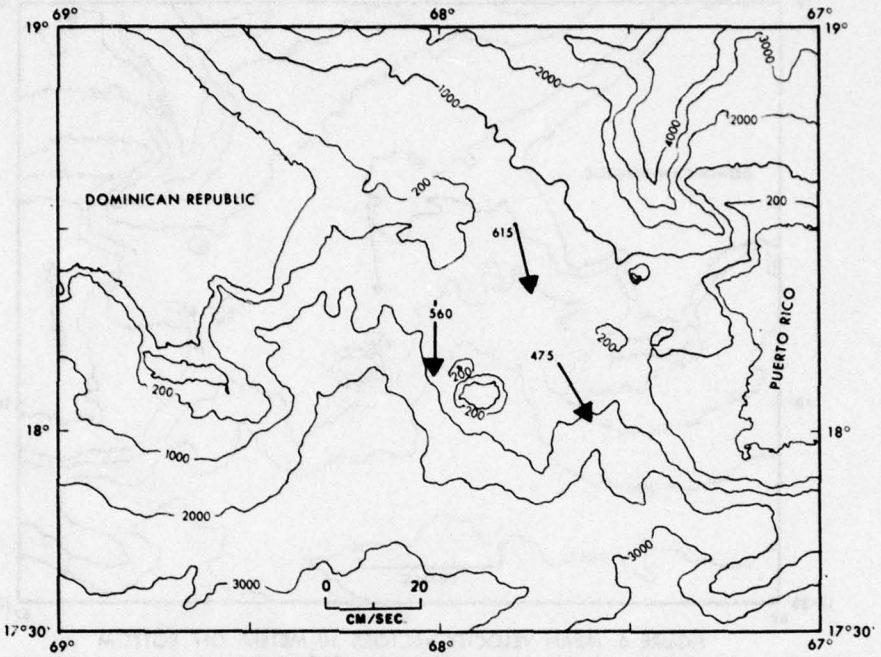

FIGURE 4. MEAN VELOCITY VECTORS 10 METERS OFF BOTTOM (BURNS AND CAR 1972)

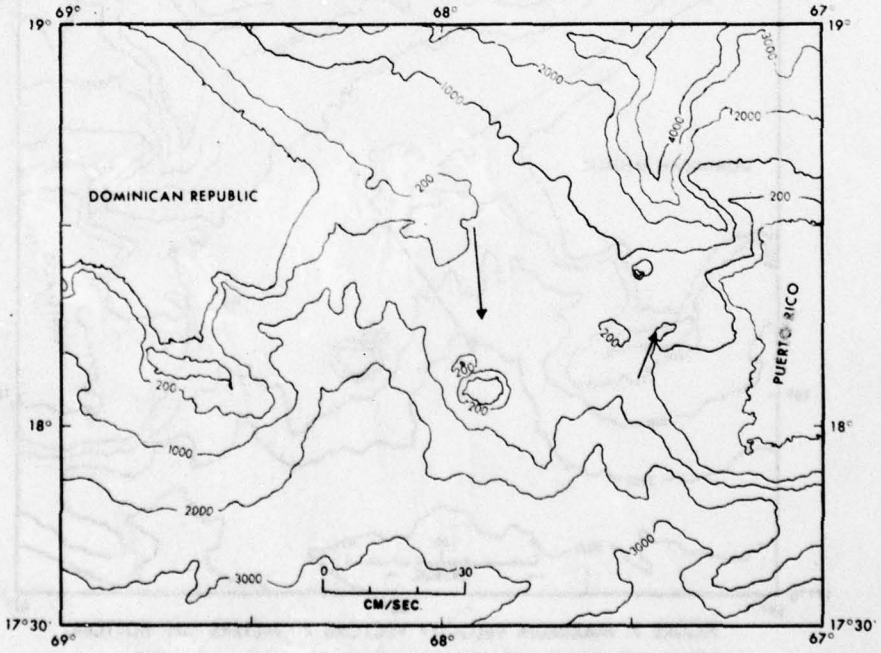

FIGURE 5. MEAN VELOCITY VECTORS 20 METERS OFF BOTTOM

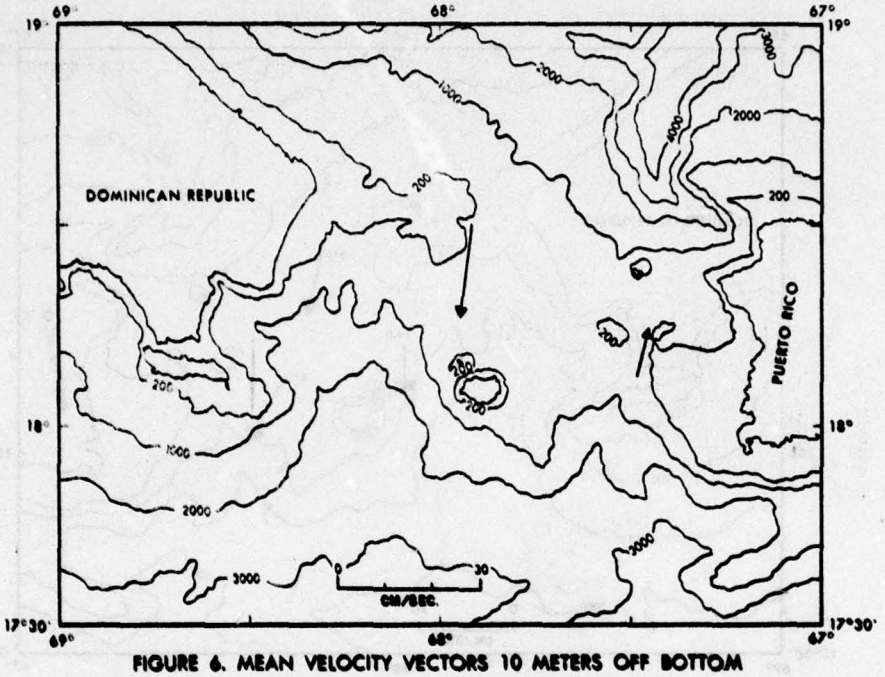

FIGURE 6. MEAN VELOCITY VECTORS 10 METERS OFF BOTTOM

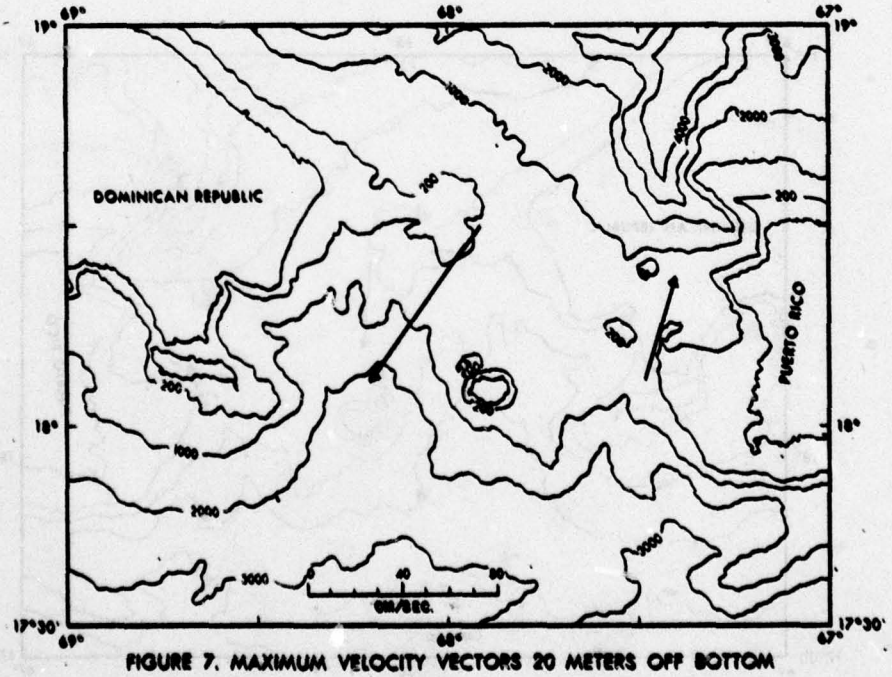

FIGURE 7. MAXIMUM VELOCITY VECTORS 20 METERS OFF BOTTOM

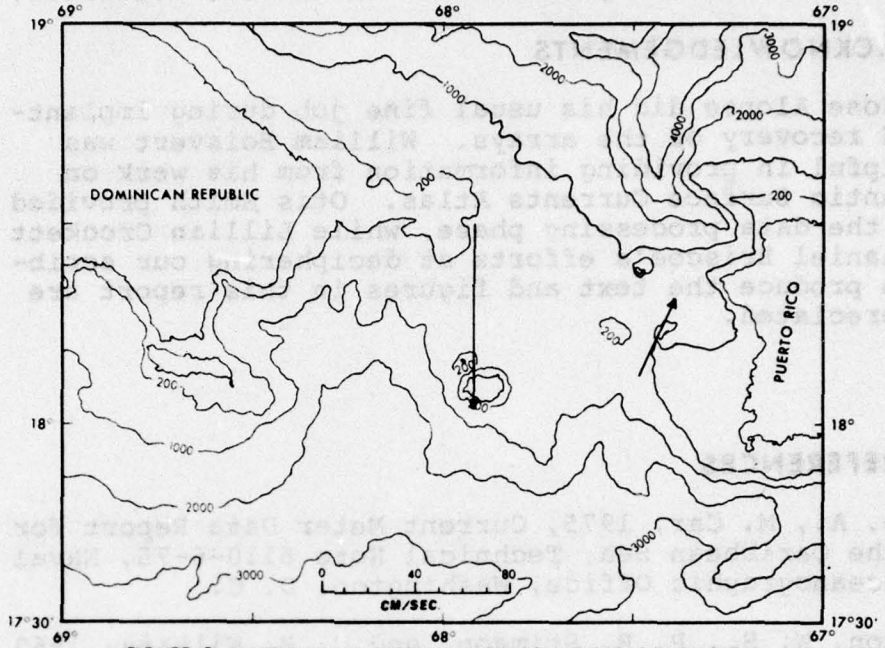

FIGURE 8. MAXIMUM VELOCITY VECTOR 10 METERS OFF BOTTOM

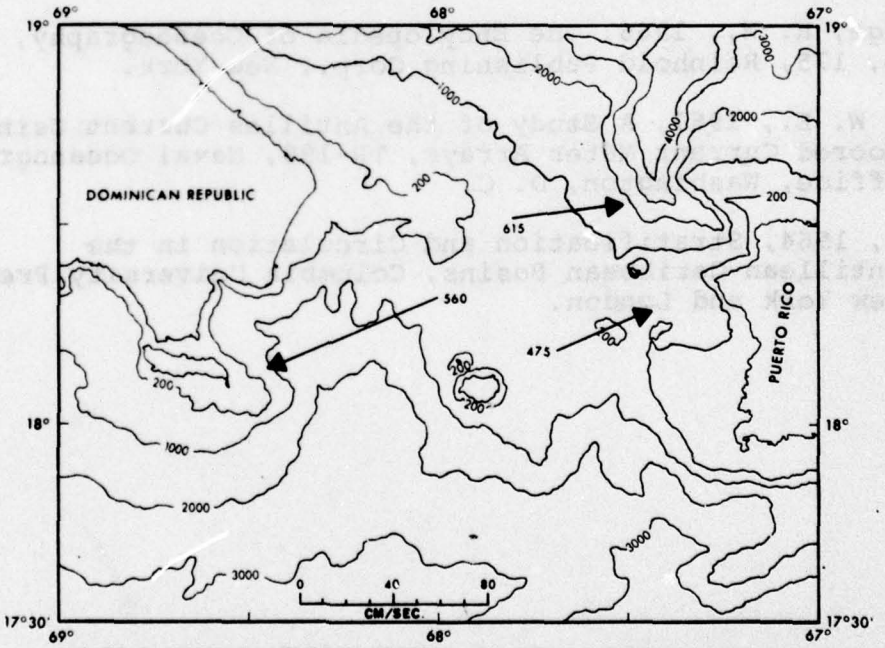

FIGURE 9. MAXIMUM VELOCITY VECTORS 10 METERS OFF BOTTOM
(BURNS AND CAR 1972)

with meters spaced between the surface and the bottom. Maximum velocities through the passage should occur in the area of the salinity maximum or in the surface water.

V. ACKNOWLEDGEMENTS

Jose Alonso did his usual fine job during implantment and recovery of the arrays. William Boisvert was most helpful in providing information from his work on the Atlantic Surface Currents Atlas. Otis Smith provided help in the data processing phase, while Lillian Crockett and Nathaniel Briscoe's efforts at deciphering our scribbling to produce the text and figures in this report are most appreciated.

VI. REFERENCES

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Maloney, W. E., 1967, A Study of the Antilles Current Using Moored Current Meter Arrays, TR-199, Naval Oceanographic Office, Washington, D. C.

Wüst, G., 1964, Stratification and Circulation in the Antillean-Caribbean Basins, Columbia University Press, New York and London.

APPENDIX A

ARRAY 1

NOAA MOORING [illegible] METER DEPTH 385 M METER ON 1825Z 02 MAR 1975 MEAN SPEED 10.18 CM/SEC
38 [illegible] N WATER DEPTH 405 M PLANTED 2020Z 02 MAR MEAN DIRECTION 22.42 DEGREES TRUE
67 2 [illegible] W VARIATION 0 W FIRST FRAME IN FILE 2025Z 02 MAR MEDIAN SPEED 9.20 CM/SEC
ANCHOR # 1 CALCULATED FRAMES 3212 MAXIMUM SPEED 45.00 CM/SEC
C# [illegible] FRAMES RECORDED 3212 RECOVERED 1640Z 14 JUL 1975 DIRECTION OF MAXIMUM 17.30 DEGREES TRUE
SURFACE BUOY 60 MINUTE OBSERVATIONS STANDARD DEVIATION 6.79 CM/SEC

SPEED	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	SUM	PCT
0 - 10	23	48	65	63	62	18	5	3	1		1											289	9.0
10 - 20	32	52	80	78	65	35	13	5	2	1		1										344	10.7
20 - 30	15	43	45	49	40	20	12		1													225	7.0
30 - 40	18	38	32	32	22	8	5	3	1	2												161	5.0
40 - 50	19	19	21	25	6	3		2		1												96	3.0
50 - 60	19	19	18	6	1	2																56	1.7
60 - 70	6	16	12		2																	36	1.1
70 - 80	11	20	5	1																		37	1.2
80 - 90	6	20	5	2																		33	1.0
90 - 100	13	22	7																			42	1.3
100 - 110	9	15	7	2	2		1															36	1.1
110 - 120	8	10	9	3	1	2																33	1.0
120 - 130	16	16	15	3		1																51	1.6
130 - 140	15	13	17	10	5	1																61	1.9
140 - 150	15	21	22	6	1	9	2		1													77	2.4
150 - 160	14	24	28	11	3	6		2														88	2.7
160 - 170	8	28	23	10	8	7		3														79	2.5
170 - 180	13	23	30	16	12	2	4		1													101	3.1
180 - 190	17	25	29	25	13	5	2	1														117	3.6
190 - 200	13	19	27	22	9	9	4			2												105	3.3
200 - 210	6	19	16	24	9	5	1		1													79	2.5
210 - 220	8	20	20	18	5	2	2															75	2.3
220 - 230	11	21	9	8	9	2	1															60	1.9
230 - 240	13	11	10	6	1	1																42	1.3
240 - 250	8	13	8	1	1																	31	1.0
250 - 260	6	11	6	2	1																	26	.8
260 - 270	10	15	3	2																		30	.9
270 - 280	5	2	5																			12	.4
280 - 290	8	9	2																			19	.6
290 - 300	13	5	7																			25	.8
300 - 310	11	12	6	2	2																	31	1.0
310 - 320	14	8	2	2			2															28	.9
320 - 330	14	19	11	4		2																50	1.6
330 - 340	15	25	23	9	9	6	1															88	2.7
340 - 350	11	34	38	36	28	7	6	2	1													161	5.0
350 - 360	22	32	46	53	37	18	7	8	1	1												218	6.8
SUM	438	739	703	531	353	171	66	22	10	7	1	1	0	0	0	0	0	0	0	0	0	3042	
PCT	14.6	23.0	21.9	16.5	11.0	5.3	2.1	.7	.3	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		

NUMBER OF ZERO SPEED AVERAGES = 169 PERCENTAGE ZERO SPEED AVERAGES = 5.3
TOTAL NUMBER OF OBS. = 3211

APPENDIX A YAQUINA

MOORA PASSAGE
18 07.08 N
67 29.07 W
ARRAY 1
CM N-128
SERIAL 1217

METER DEPTH 395 M
WATER DEPTH 405 M
VARIATION 8 W
CALCULATED FRAMES 3212
FRAMES RECORDED 3212
60 MINUTE OBSERVATIONS

METER ON 19257 02 MAR 1975
PLANTED 20207 02 MAR
FIRST FRAME IN FILE 20252 02 MAR
RECOVERED 16407 14 JUL 1975

MEAN SPEED 10.56 CM/SEC
MEAN DIRECTION 14.97 DEGREES TRUE
MEDIAN SPEED 9.60 CM/SEC
MAXIMUM SPEED 37.20 CM/SEC
DIRECTION OF MAXIMUM 25.80 DEGREES TRUE
STANDARD DEVIATION 6.32 CM/SEC

SPEED	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80		
0 - 10	27	46	59	43	28	20	5				1											229	7.1
10 - 20	21	60	72	54	38	23	4			1												273	8.5
20 - 30	21	42	48	52	26	17	3			2	1											212	6.6
30 - 40	17	39	42	30	14	8	3	2														155	4.8
40 - 50	10	32	28	16	6	8	1	1														102	3.2
50 - 60	9	20	16	9	2	1																57	1.8
60 - 70	7	14	9	8	1																	39	1.2
70 - 80	4	14	9	2		1																29	.9
80 - 90	13	14	9	3		2																41	1.3
90 -100	6	17	15	5			1															44	1.4
100 -110	12	14	5	2	1																	34	1.1
110 -120	11	13	10	4																		38	1.2
120 -130	15	20	9	3	1																	48	1.5
130 -140	11	21	12	6	5	3	1															59	1.8
140 -150	11	21	16	7	2	4	4	1														66	2.1
150 -160	8	23	13	12	7	8	2	1														74	2.3
160 -170	10	18	33	15	14	7	3			1												101	3.1
170 -180	9	28	22	21	9	12	1	1	1													104	3.2
180 -190	8	17	41	41	25	9	8	6	3													158	4.9
190 -200	11	18	32	18	20	15	9	4	1	1												129	4.0
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210 -220	9	22	17	22	11	8	1				1											91	2.8
220 -230	11	18	12	15	14	4																74	2.3
230 -240	11	15	7	4	5	2	1															45	1.4
240 -250	13	17	10	7		1																48	1.5
250 -260	10	9	5	2		1																27	.8
260 -270	8	14	9	1	2																	34	1.1
270 -280	5	11	6																			22	.7
280 -290	10	11	9	2																		32	1.0
290 -300	8	23	8	2																		41	1.3
300 -310	10	17	9	4	1	1																42	1.3
310 -320	13	15	19	8	1	1	1															58	1.8
320 -330	8	26	19	7	9	2				1												71	2.2
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340 -350	9	28	44	37	16	9		1	1													145	4.5
350 -360	11	37	48	51	35	19	3	1														205	6.4
SUM	400	797	780	563	321	206	57	18	12	4	0	0	0	0	0	0	0	0	0	0	0	3158	
PER CT.	12.5	24.8	24.3	17.5	10.0	6.4	1.8	.6	.4	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		

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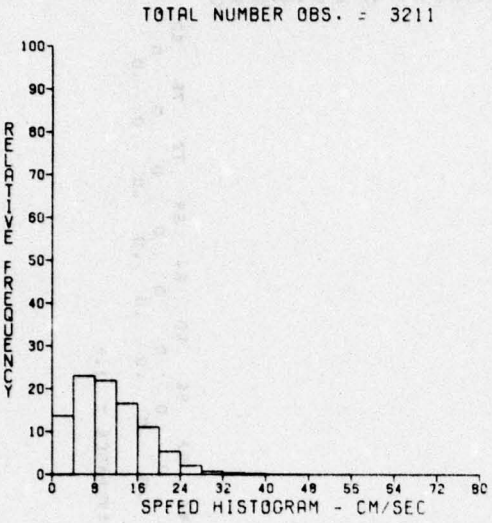
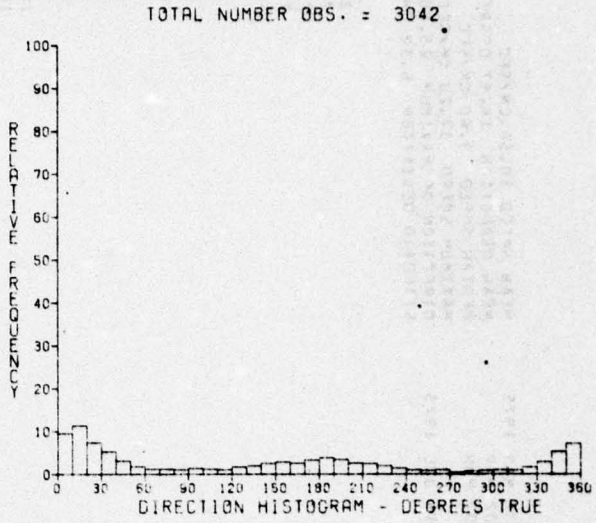
TOTAL NUMBER OF OBS. = 3211



MONA PASSAGE ARRAY 1 DEPTH 385 M



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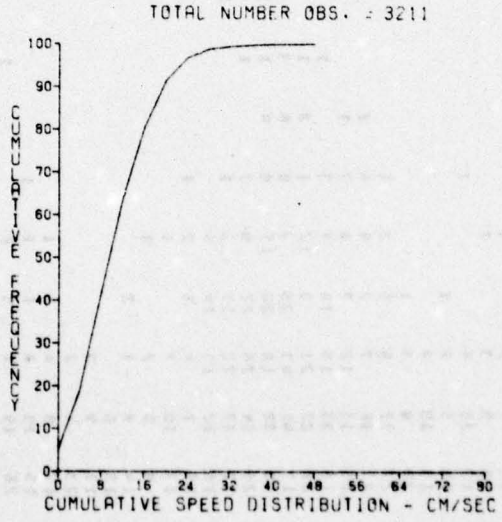
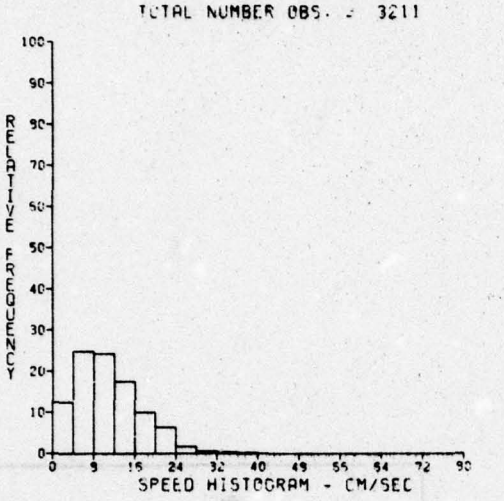


MONA PASSAGE ARRAY 1 DEPTH 385 M



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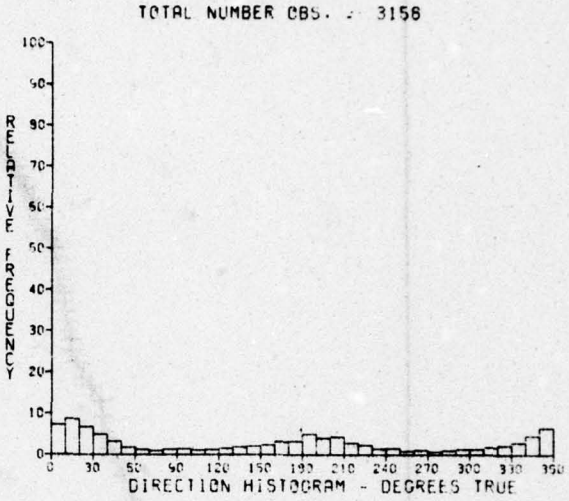
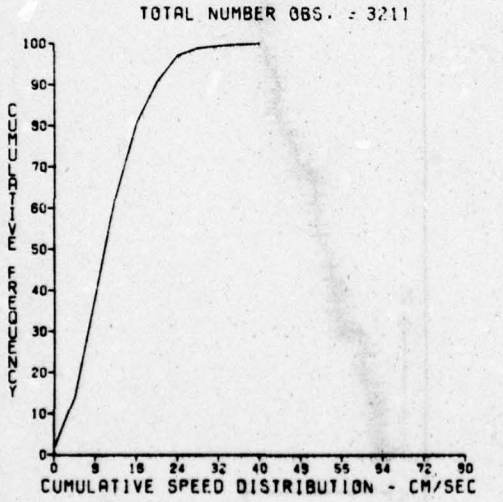
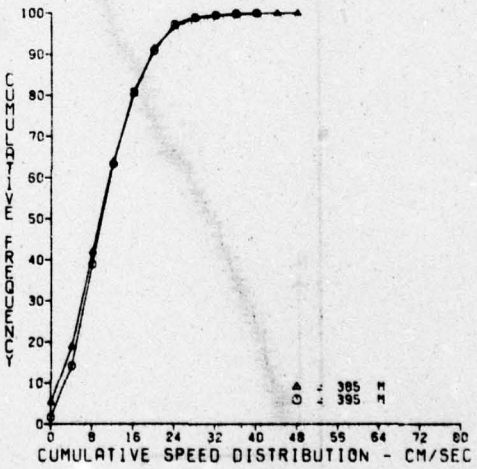


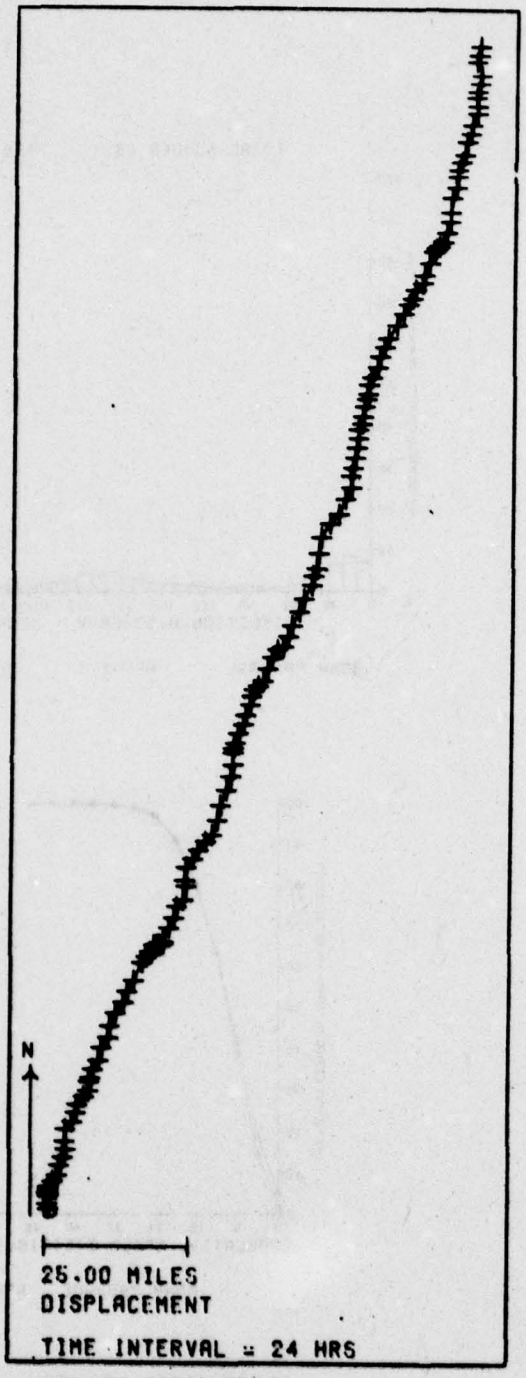
MONA PASSAGE ARRAY 1 DEPTH 395 M



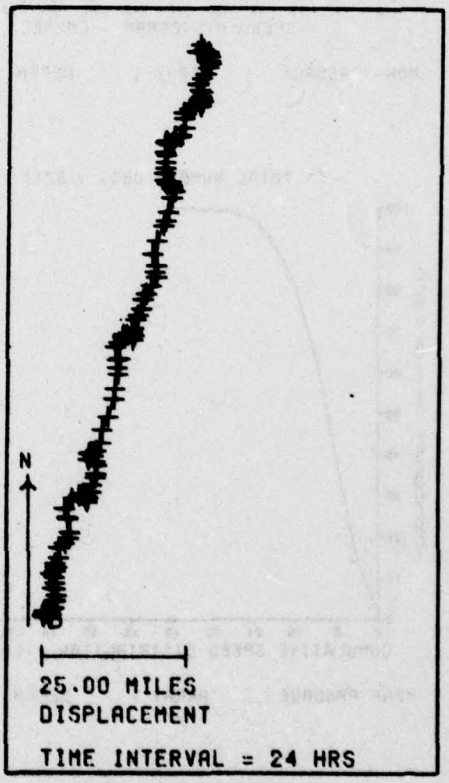
MONA PASSAGE ARRAY 1 DEPTH 395 M



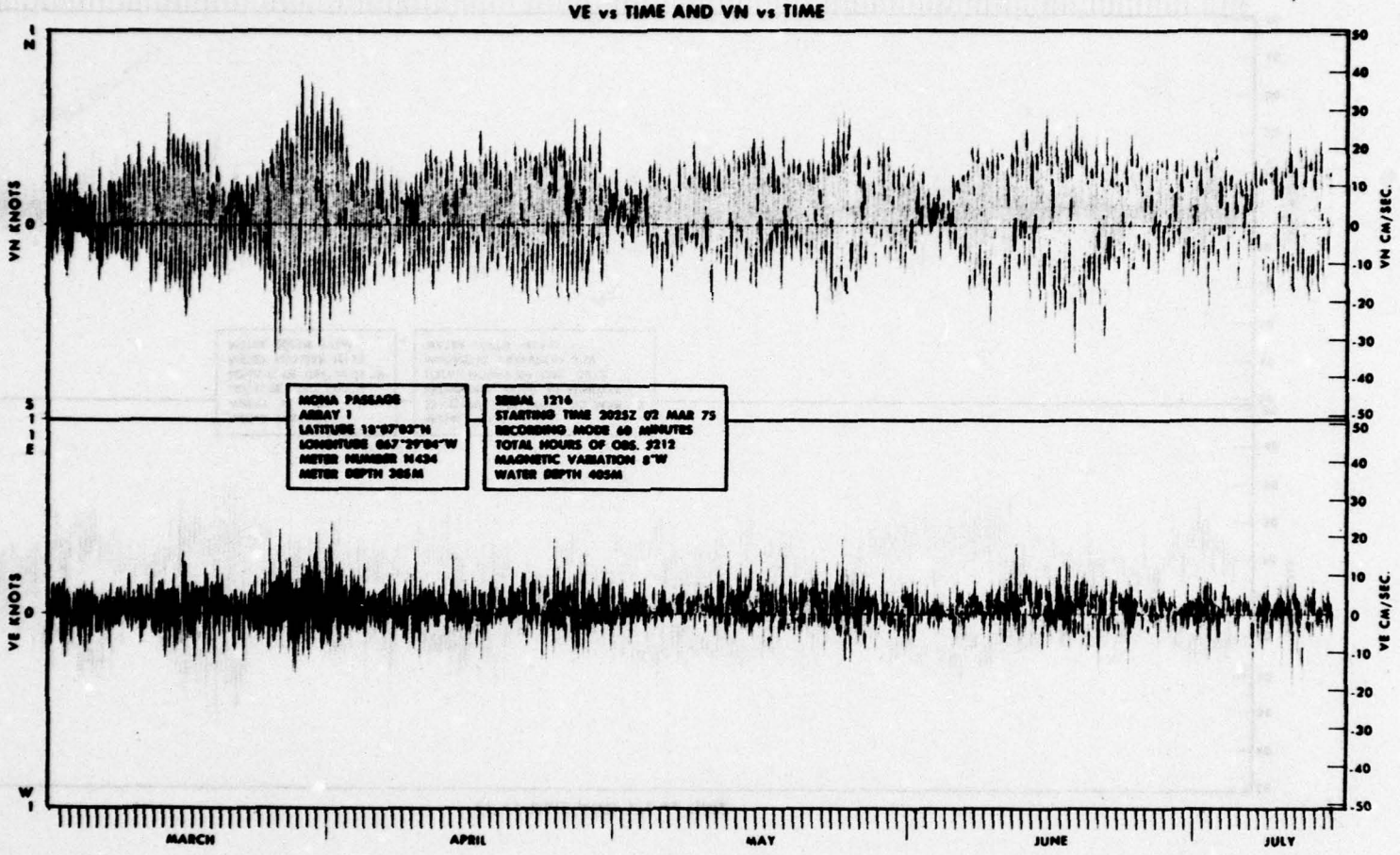
MONA PASSAGE ARRAY 1



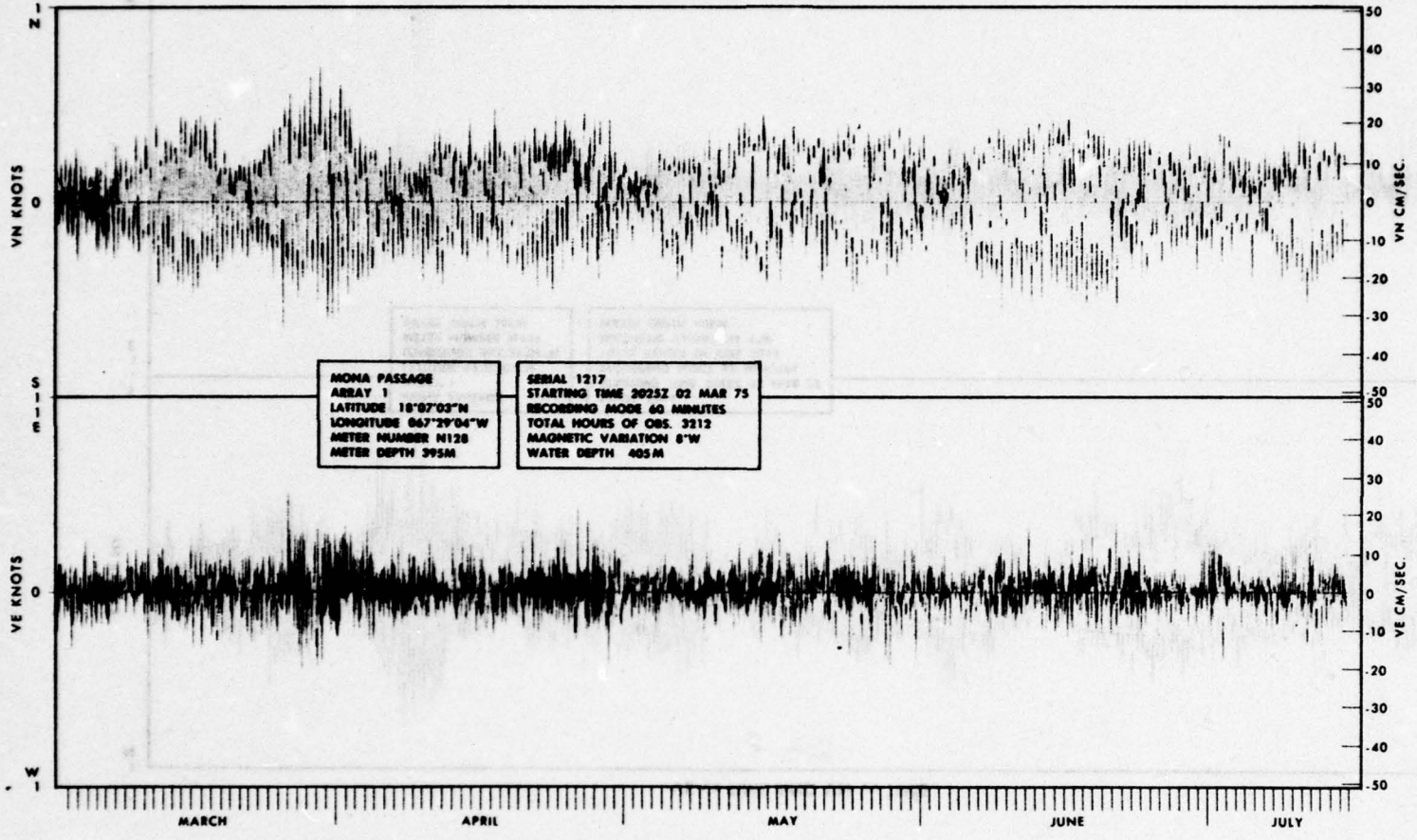
CRUISE MONA PASS
STATION 1 TOP
METER N434
DEPTH 385 METERS

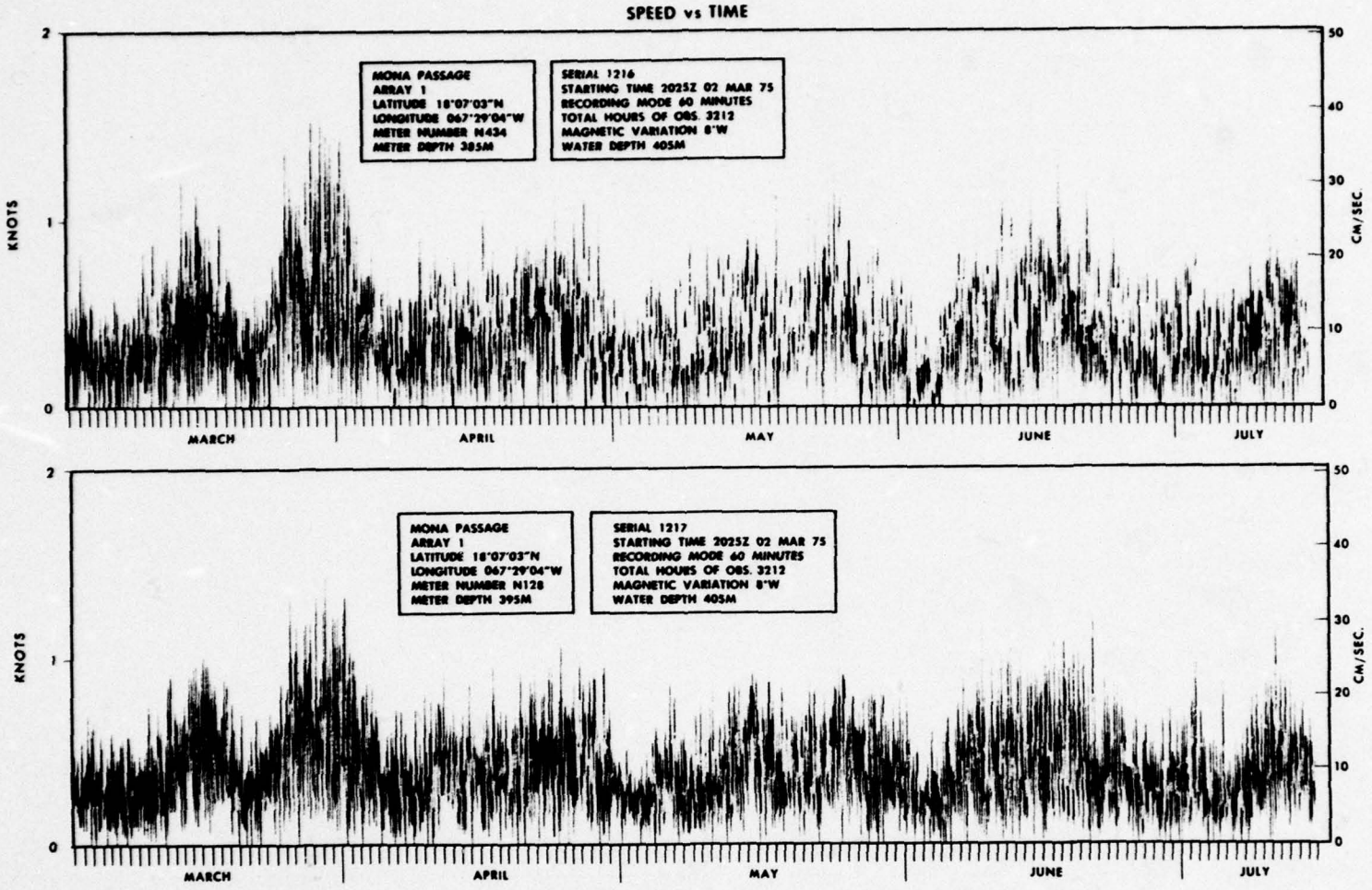


CRUISE MONA PASS
STATION 1 LOW
METER N128
DEPTH 395 METERS


VE vs TIME AND VN vs TIME
N
VN KNOTS
0
S
E
VE KNOTS
0
W
MONA PASSAGE
ARRAY 1
LATITUDE 18°07'03"N
LONGITUDE 067°29'04"W
METER NUMBER M434
METER DEPTH 385M
SERIAL 1216
STARTING TIME 2025Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 3212
MAGNETIC VARIATION 8°W
WATER DEPTH 405M
50
40
30
20
10
0
-10
-20
-30
-40
-50
VN CM/SEC.
VE CM/SEC.
MARCH
APRIL
MAY
JUNE
JULY

VE vs TIME AND VN vs TIME




SPEED vs TIME
MONA PASSAGE
ARRAY 1
LATITUDE 18°07'03"N
LONGITUDE 067°29'04"W
METER NUMBER N434
METER DEPTH 385M
SERIAL 1216
STARTING TIME 2025Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 3212
MAGNETIC VARIATION 8°W
WATER DEPTH 405M
KNOTS
CM/SEC
MARCH
APRIL
MAY
JUNE
JULY
MONA PASSAGE
ARRAY 1
LATITUDE 18°07'03"N
LONGITUDE 067°29'04"W
METER NUMBER N128
METER DEPTH 395M
SERIAL 1217
STARTING TIME 2025Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 3212
MAGNETIC VARIATION 8°W
WATER DEPTH 405M
KNOTS
CM/SEC.
MARCH
APRIL
MAY
JUNE
JULY

APPENDIX B

ARRAY 4

MOORING PASSAGE
18 30.03 N
67 55.10 W
ARRAY 4
CM N-4 29
SERIAL 1218

METER DEPTH 321 M
WATER DEPTH 341 M
VARIATION 8 W
CALCULATED FRAMES 3172
FRAMES RECORDED 2318
60 MINUTE OBSERVATIONS

METER ON 1205Z 02 MAR 1975
PLANTED 1319Z 02 MAR
FIRST FRAME IN FILE 1905Z 02 MAR
RECOVERED 1755Z 12 JUL 1975

MEAN SPEED 19.52 CM/SEC
MEAN DIRECTION 175.47 DEGREES TRUE
MEDIAN SPEED 17.20 CM/SEC
MAXIMUM SPEED 79.90 CM/SEC
DIRECTION OF MAXIMUM 215.60 DEGREES TRUE
STANDARD DEVIATION 12.94 CM/SEC

SPEED	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80		
0 - 10	1	9	11	14	18	23	13	14	10	6	5	4	2	1								131	5.7
10 - 20	3	12	22	15	13	13	15	10	5	1	3		1			1						104	4.5
20 - 30	4	12	18	16	13	7	4	5	2	1												82	3.5
30 - 40	4	7	12	8	11	12	1	1		1												57	2.5
40 - 50	6	14	8	10	8	6	2	2														56	2.4
50 - 60	4	9	17	11	7	1	3	4		1												57	2.5
60 - 70	4	11	11	6	5	3	2	1	1													44	1.9
70 - 80	6	8	12	8	4	2		1	1													42	1.8
80 - 90		5	3	4	5	1	2	1		1												22	.9
90 - 100	8	11	4	4	3	5	3	1														39	1.7
100 - 110		9	3	3	4	2	1		1			1										26	1.1
110 - 120	2	4	6	5	1	2	4	2			1	2										29	1.3
120 - 130	4	8	10	6	5	4	5	3	3	2												50	2.2
130 - 140	5	9	8	6	2	3	3	2	2	1	1	1	2		1		1					47	2.0
140 - 150	1	5	8	13	8	8	9	4		3	1	1	3	1		1						66	2.8
150 - 160	8	6	9	9	8	9	11	6	4	4		2				1						77	3.3
160 - 170	2	8	16	15	12	12	7	6	3	2	2	1	1	2	1							90	3.9
170 - 180	4	13	16	11	11	5	7	8	4	6	1	2	2	3	1		1	1				96	4.1
180 - 190	2	5	9	20	16	16	12	13	8	7	8	2	3	2		1						124	5.4
190 - 200	6	6	13	8	5	20	15	13	14	9	3	8	5	6		2	1	1	2	1		138	6.0
200 - 210	6	10	16	15	15	18	15	17	13	8	10	2	2	2	2	2						153	6.6
210 - 220	3	8	8	12	7	7	11	12	9	9	6	3	5		1		1				1	102	4.4
220 - 230	3	8	10	11	9	14	5	12	10	4	1	1	3	1	1	1						94	4.1
230 - 240	1	5	8	3	10	7	4	2	1	4	3		3			2	1					54	2.3
240 - 250	6	3	5	8	4	2	2		1		1				1							33	1.4
250 - 260	1	4	3	5			1	3	2		1											20	.9
260 - 270	5	12	9	1	2	2	1		1					1								34	1.5
270 - 280	1	4	4	1	1	1																12	.5
280 - 290	4	6	2		2	3				1												18	.8
290 - 300	3	9	1	6	2		2															23	1.0
300 - 310	3	4	5	4	3	4	1		1													25	1.1
310 - 320	4	7	9	5	4	3	1				1											34	1.5
320 - 330	6	14	3	9	8		6		1	1	1											49	2.1
330 - 340	2	12	7	16	10	13	4	1	1	2		1										69	3.0
340 - 350	4	13	10	14	16	8	9	7	3	2		1	1			1						89	3.8
350 - 360	3	11	9	16	17	12	13	16	4	4	6	3	2	1	1							118	5.1
SUM	129	301	387	318	269	248	194	166	105	80	55	35	35	20	9	12	5	2	2	2		2304	
PER CT.	5.6	13.0	13.7	13.7	11.6	10.7	8.4	7.2	4.5	3.5	2.4	1.5	1.5	.8	.4	.5	.2	.1	.1	.1			

NUMBER OF ZERO SPEED AVERAGES = 13 PERCENTAGE ZERO SPEED AVERAGES = .6
TOTAL NUMBER OF OBS. = 2317

MOORING PASSAGE
18 30.03 N
67 55.10 W
ARRAY A
CM N-4 13
SERIAL 12 19

METER DEPTH 331 M
WATER DEPTH 341 M
VARIATION 8 W
CALCULATED FRAMES 3172
FRAMES RECORDED 1098
60 MINUTE OBSERVATIONS

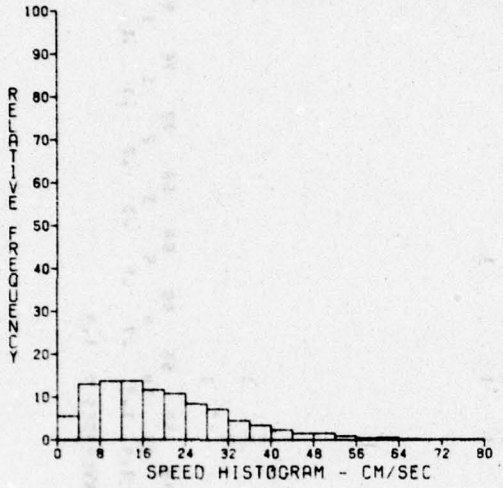
METER ON 1205Z 02 MAR 1975
PLANTED 1319Z 02 MAR
FIRST FRAME IN FILE 1405Z 02 MAR
RECOVERED 1755Z 12 JUL 1975

MEAN SPEED 19.83 CM/SEC
MEAN DIRECTION 188.32 DEGREES TRUE
MEDIAN SPEED 17.00 CM/SEC
MAXIMUM SPEED 78.20 CM/SEC
DIRECTION OF MAXIMUM 180.40 DEGREES TRUE
STANDARD DEVIATION 13.80 CM/SEC

SPEED	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80		
0 - 10	1	3	5	7	10	6	2	2	2													38	3.5
10 - 20	2	5	1	3	2	2	3			1												19	1.7
20 - 30	3	2	8	3	2	1	1	2														22	2.0
30 - 40	1	6	8	2	1	1																19	1.7
40 - 50	1	3	2	2		1		1														10	.9
50 - 60	1	1	5		1																	8	.7
60 - 70	2	4	1	2	1			2														11	1.0
70 - 80		6	2	3	2	1																14	1.3
80 - 90	3	2	3	3	1		1															13	1.2
90 - 100	1	5	4	1		1	1		1													14	1.3
100 - 110	3	2	3	4	5	1	3															21	1.9
110 - 120	2	5		4	4	1	2	2		1	2		1									24	2.2
120 - 130	1	6	4	4	2		1	2	2	1	1			2	1	2						29	2.6
130 - 140	1	1	3	3	6	1	1		3	3	2	1	2	2	1		1					31	2.8
140 - 150	2	3	5	7	6	5	2	5	2	2	2	4	1		1		1					48	4.4
150 - 160	3	6	6	6	4	3	8	3	4	2	2	1	1	1			1					51	4.6
160 - 170	3	2	7	5	8	4	8	2	2	3	4			2		1						51	4.6
170 - 180	2	3	5	12	8	6	7	2	2	3		4	1		1							56	5.1
180 - 190	2	6	3	4	14	7	4	5	8	2	2	2	2	1	1						1	64	5.8
190 - 200	2	3	2	8	13	4	4	7	12	7	3	2		2	2			2	1			74	6.7
200 - 210	5	7	3	4	6	10	2	6	5	3	3	4	1	1	1	1						62	5.7
210 - 220	3	7	3	6	5	2	6	3	2	3	3	1	1	1		1						47	4.3
220 - 230	2	4	5	3	4	3	4	3		3	1											32	2.9
230 - 240	2	2	3	5	1	3	3		1													20	1.8
240 - 250		1		5			1			1	1											9	.8
250 - 260	1	3		3	1	1	1	1														11	1.0
260 - 270	3	5	2	1																		11	1.0
270 - 280	1	3	1																			5	.5
280 - 290		3	1	1		1																6	.5
290 - 300	4	4	3	3	2	2	1	3														22	2.0
300 - 310	3	4	4	6	1	3	1	2														24	2.2
310 - 320	3	4	5	5	2	4	3	2		1			1									30	2.7
320 - 330	2	3	3	5	10	5	4	6	2		1		1									42	3.8
330 - 340	2	4	6	3	9	3	3	1		6	2	1	2	1								43	3.9
340 - 350	1	5	6	2	10	4	5	5	5	1			1									45	4.1
350 - 360	1	6	11	5	5	5	5	2	5	4		1		1								51	4.6
SUM	69	139	133	140	146	91	87	98	58	47	29	21	15	14	8	5	3	2	1	1		1077	
PER CT.	6.3	12.7	12.1	12.8	13.3	8.3	7.9	6.2	5.3	4.3	2.6	1.9	1.4	1.3	.7	.5	.3	.2	.1	.1			

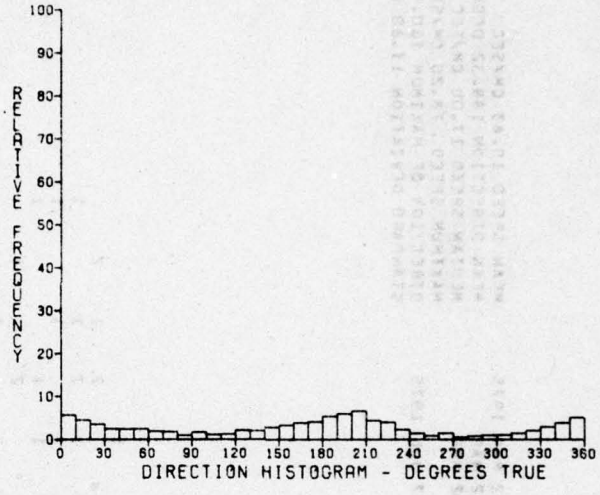
NUMBER OF ZERO SPEED AVERAGES = 20 PERCENTAGE ZERO SPEED AVERAGES = 1.8
TOTAL NUMBER OF OBS. = 1097

TOTAL NUMBER OBS. = 2317



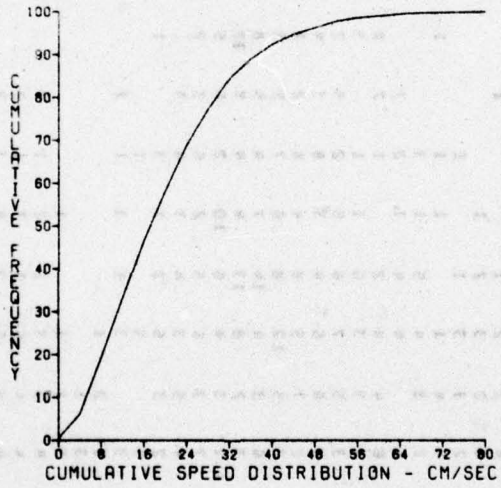
MONA PASSAGE ARRAY 4 DEPTH 321 M

TOTAL NUMBER OBS. = 2304

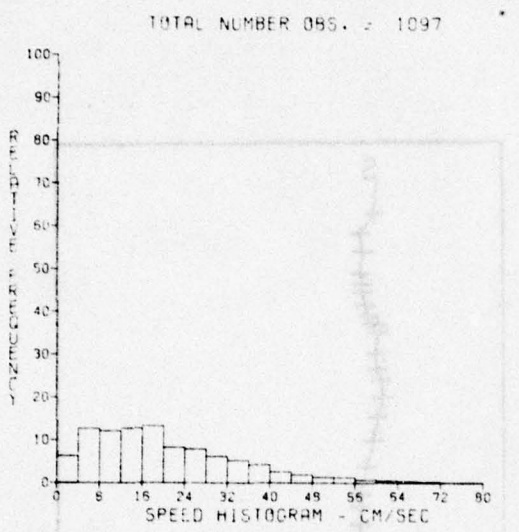


MONA PASSAGE ARRAY 4 DEPTH 321 M

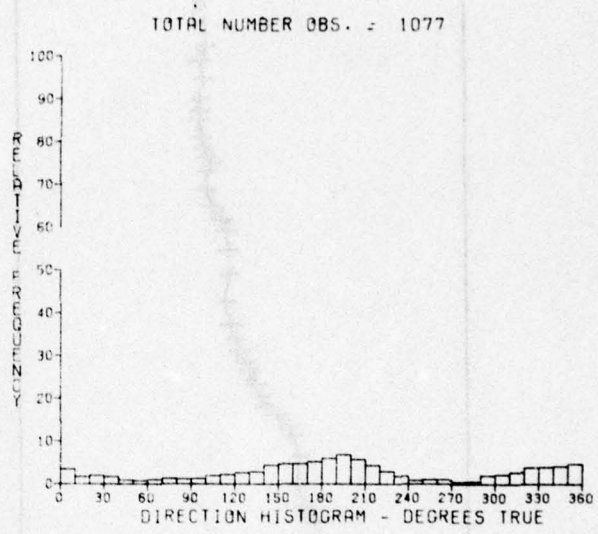
TOTAL NUMBE OBS. = 2317



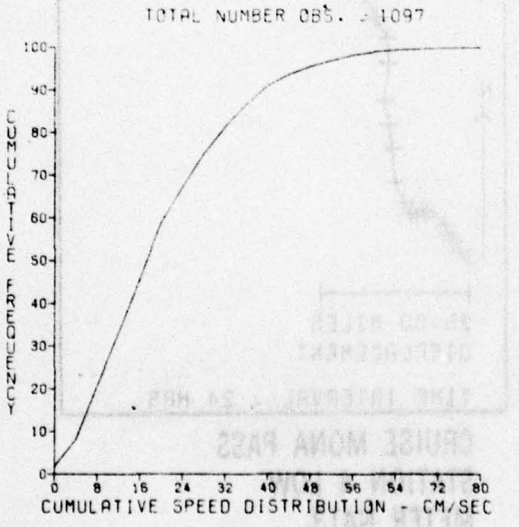
MONA PASSAGE ARRAY 4 DEPTH 321 M



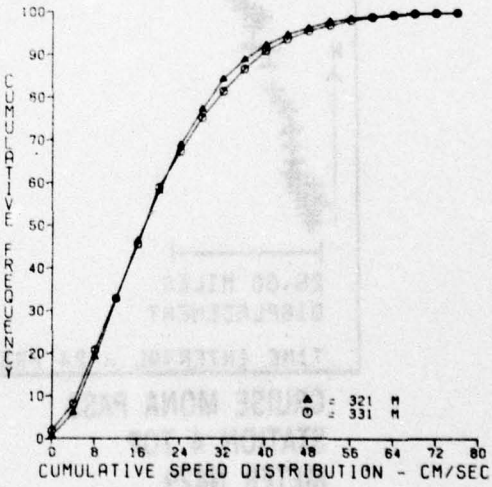
MONA PASSAGE ARRAY 4 DEPTH 331 M



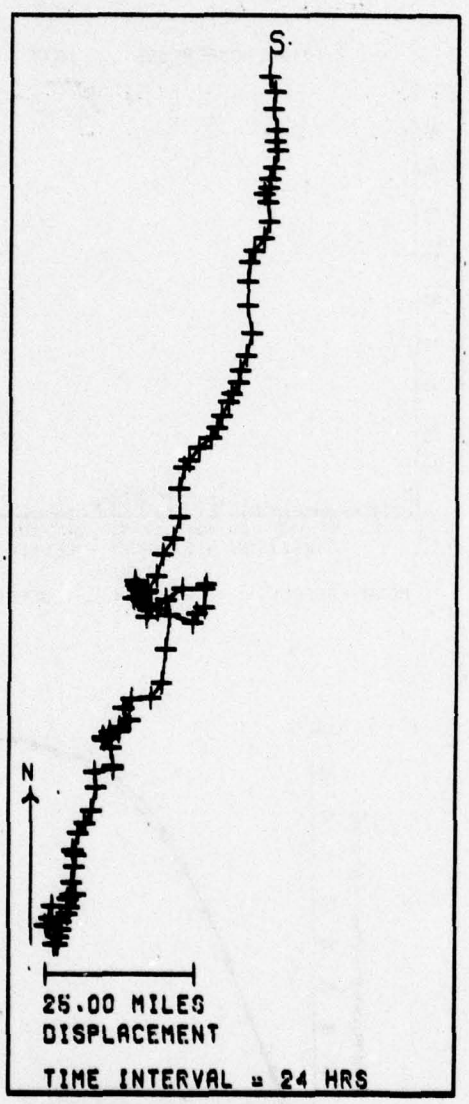
MONA PASSAGE ARRAY 4 DEPTH 331 M



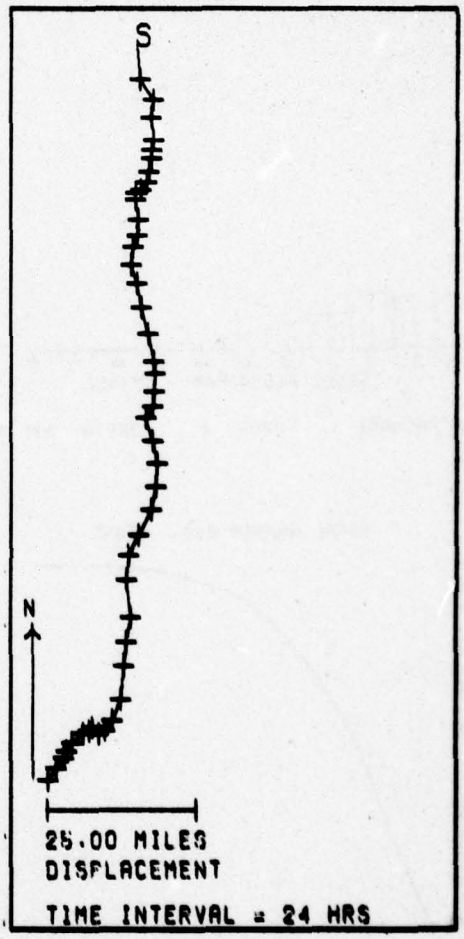
MONA PASSAGE ARRAY 4 DEPTH 331 M



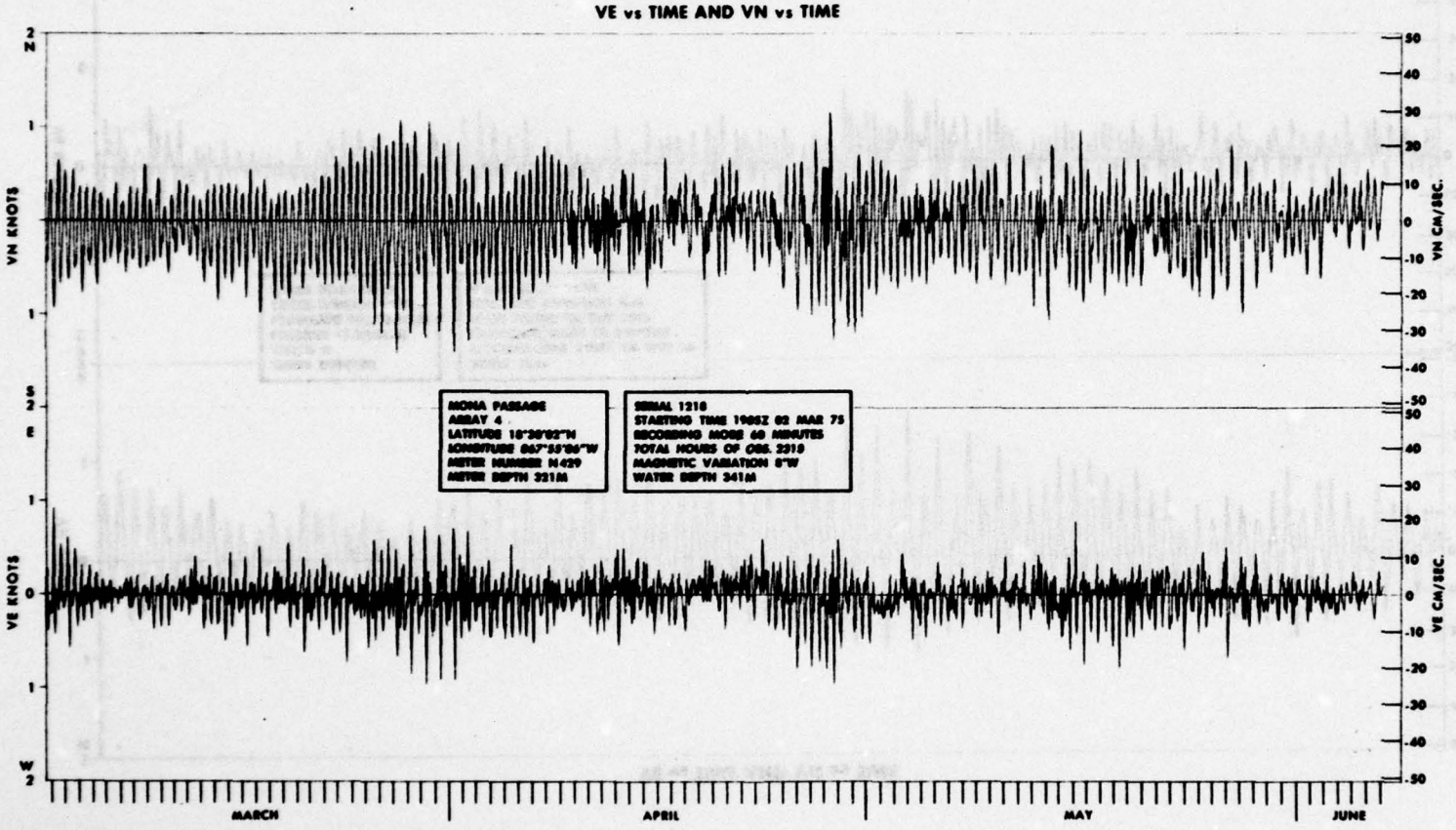
MONA PASSAGE ARRAY 4

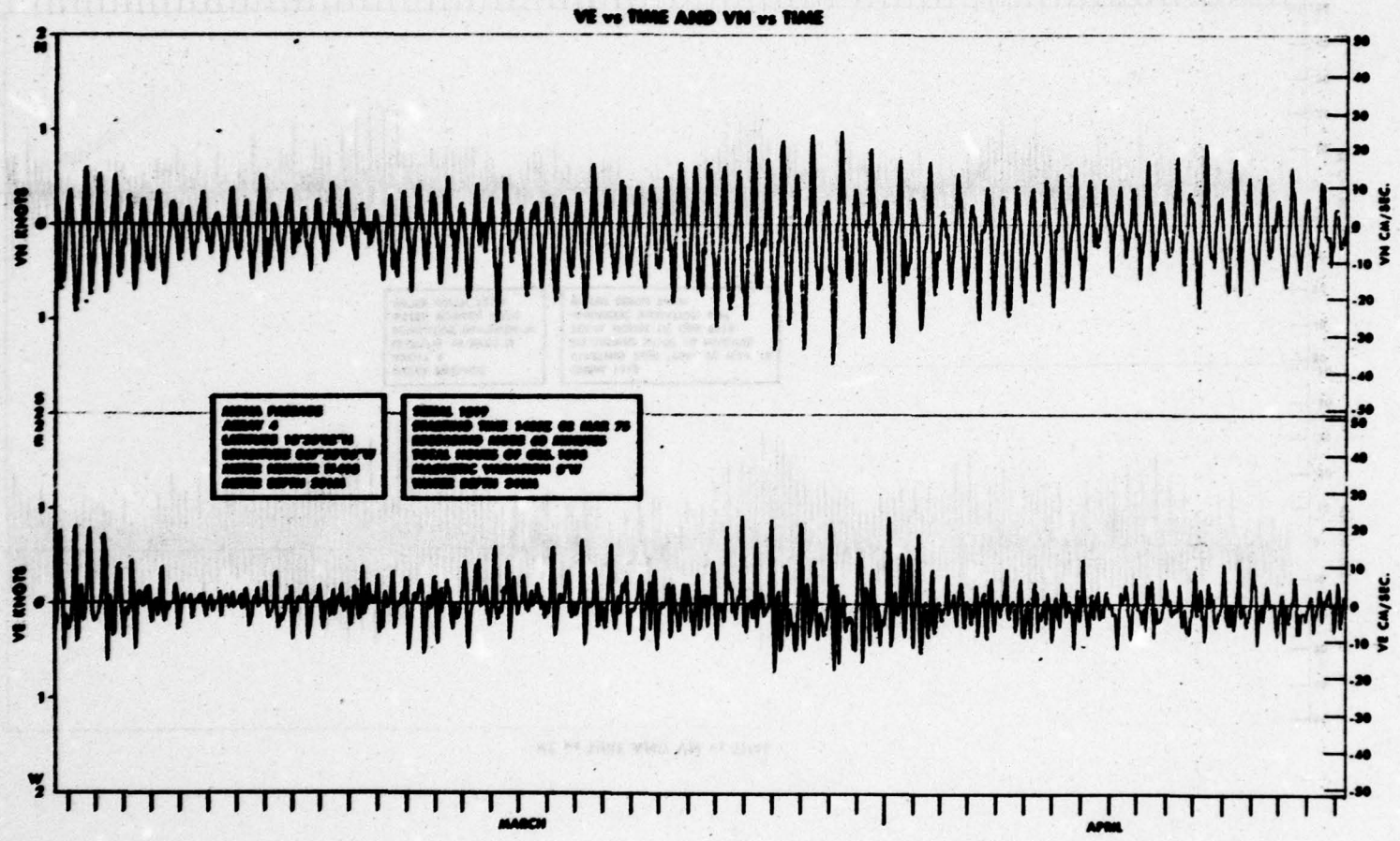


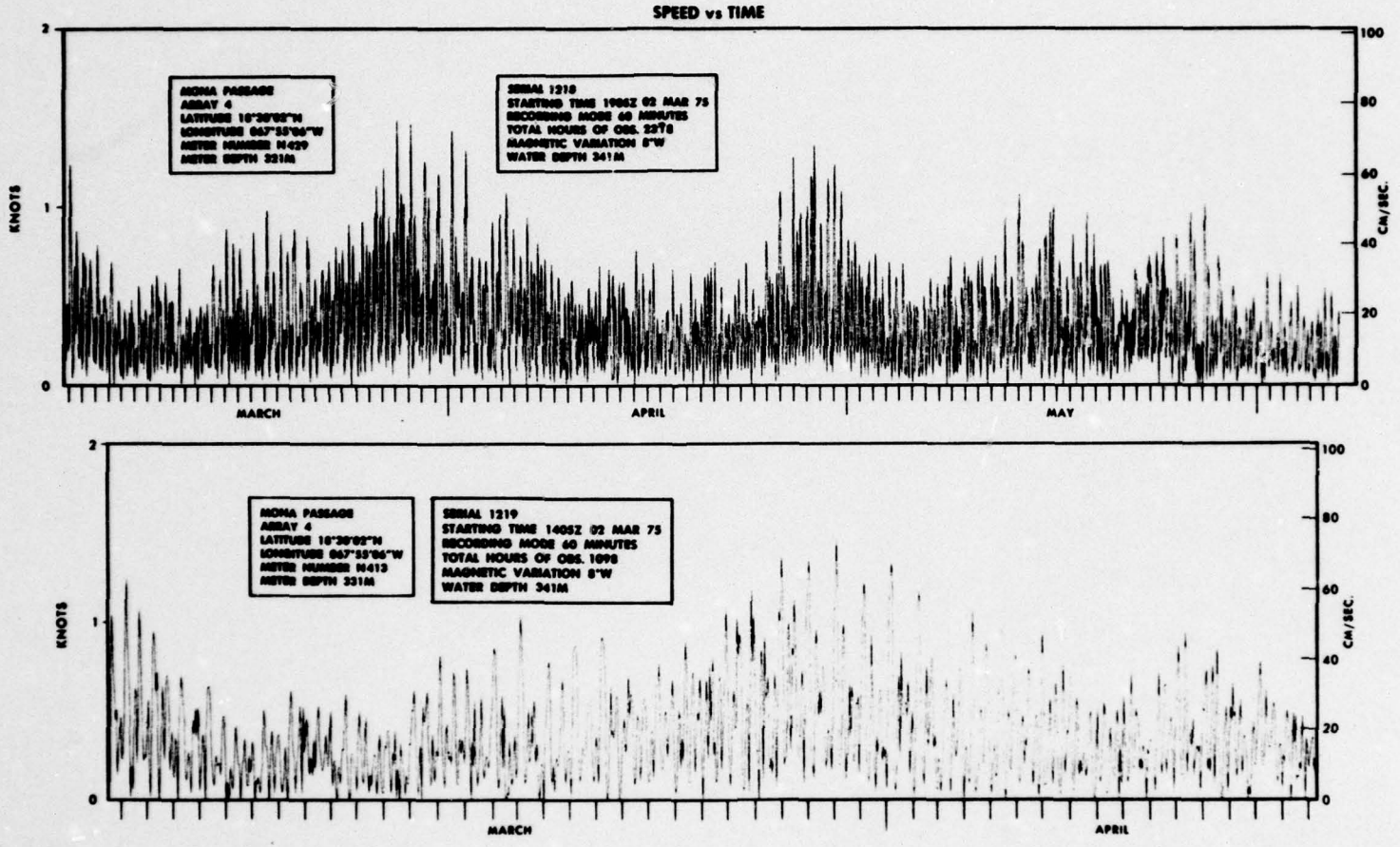
CRUISE MONA PASS
STATION 4 TOP
METER N429
DEPTH 321 METERS



CRUISE MONA PASS
STATION 4 LOW
METER N413
DEPTH 331 METERS


VE vs TIME AND VN vs TIME
VN KNOTS
VE KNOTS
VN CM/SEC.
VE CM/SEC.
MONA PASSAGE
ARRAY 4
LATITUDE 18°28'02"N
LONGITUDE 067°55'06"W
METER NUMBER N429
METER DEPTH 221M
SERIAL 1218
STARTING TIME 1905Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 2219
MAGNETIC VARIATION 8°W
WATER DEPTH 241M
MARCH
APRIL
MAY
JUNE

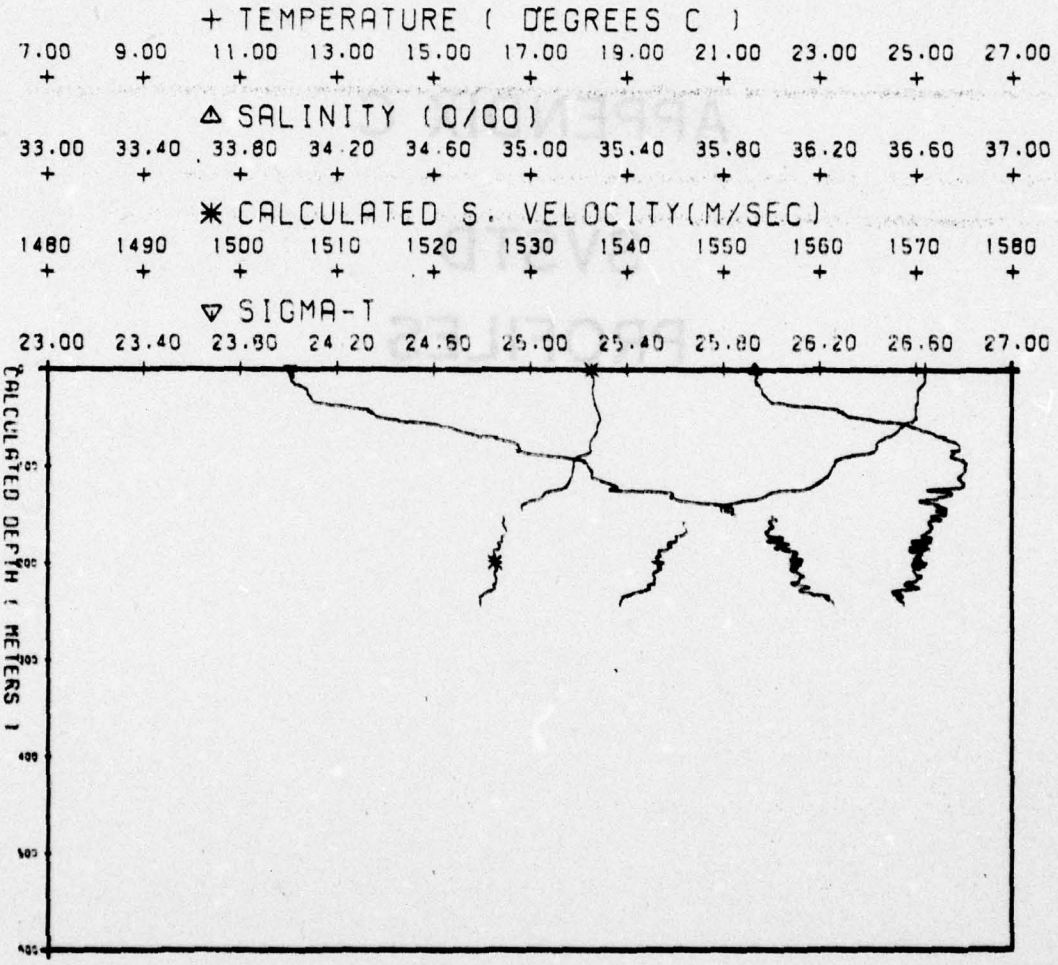

VE vs TIME AND VN vs TIME
VN KNOTS
VE KNOTS
VN CM/SEC.
VE CM/SEC.
MARCH
APRIL


SPEED vs TIME
MONA PASSAGE
ARRAY 4
LATITUDE 18°38'05"N
LONGITUDE 067°55'06"W
METER NUMBER M429
METER DEPTH 331M
SERIAL 1218
STARTING TIME 1906Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 2278
MAGNETIC VARIATION 8°W
WATER DEPTH 341M
KNOTS
CM/SEC.
MARCH
APRIL
MAY
MONA PASSAGE
ARRAY 4
LATITUDE 18°38'05"N
LONGITUDE 067°55'06"W
METER NUMBER M413
METER DEPTH 331M
SERIAL 1219
STARTING TIME 1405Z 02 MAR 75
RECORDING MODE 60 MINUTES
TOTAL HOURS OF OBS. 1698
MAGNETIC VARIATION 8°W
WATER DEPTH 341M
KNOTS
CM/SEC.
MARCH
APRIL

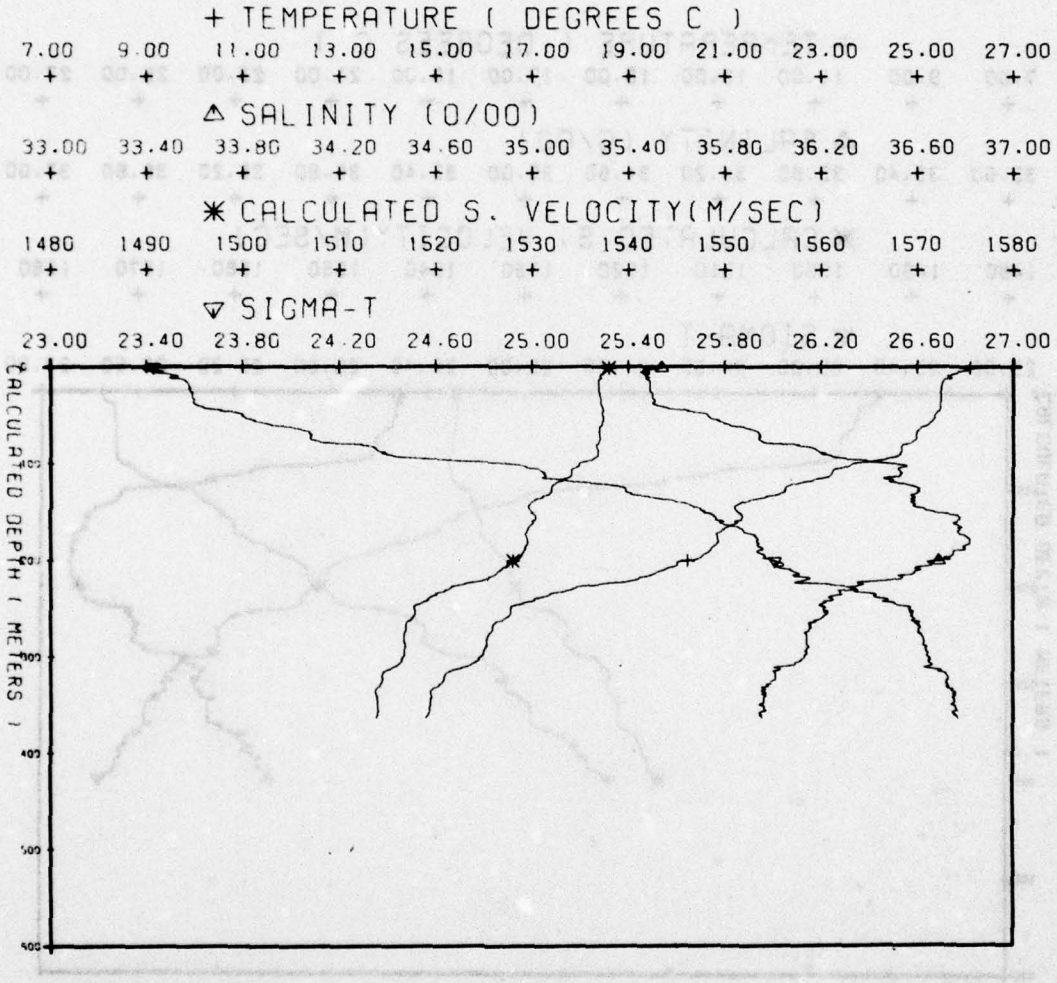
APPENDIX C

SVSTD PROFILES

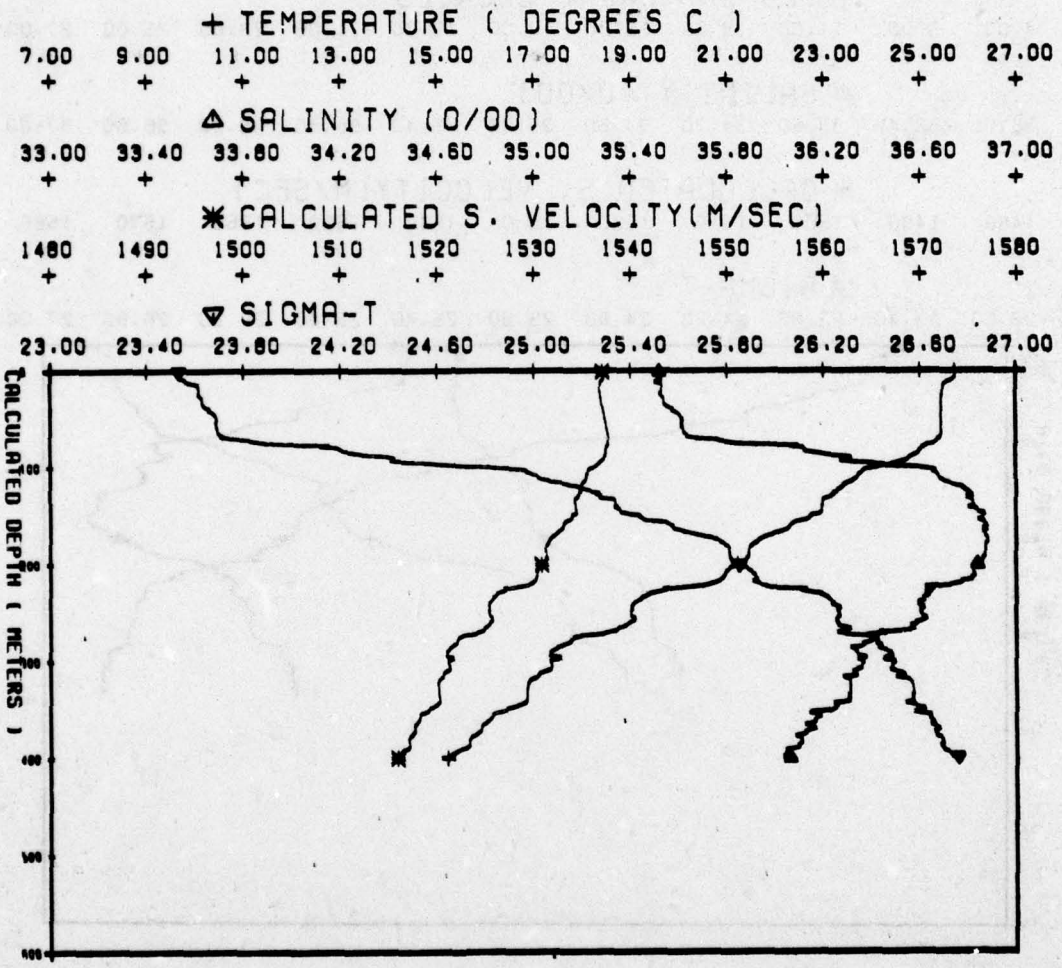
FINAL PROFILE WILKES
NAVOCEANO CRUISE 343517
STATION 005001.



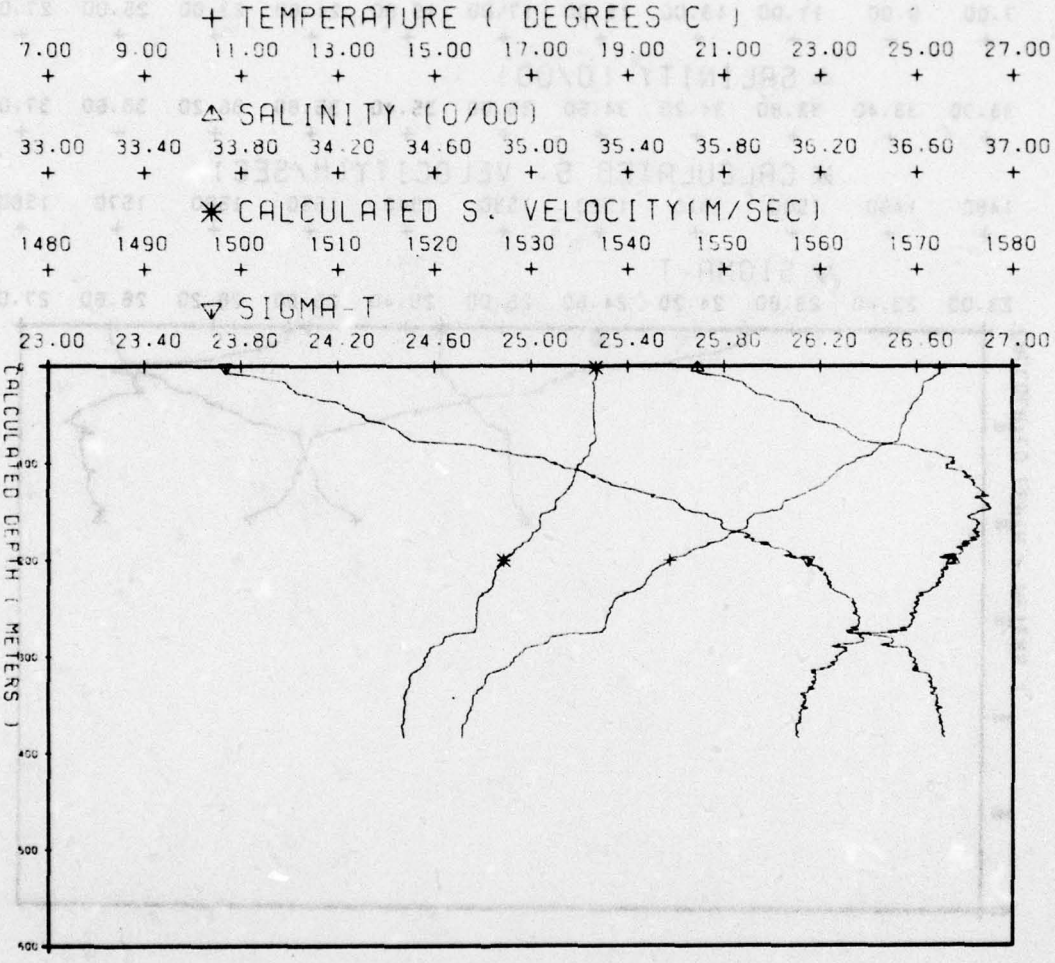
FINAL PROFILE WILKES
NAVOCEANO CRUISE 343517
STATION 001002



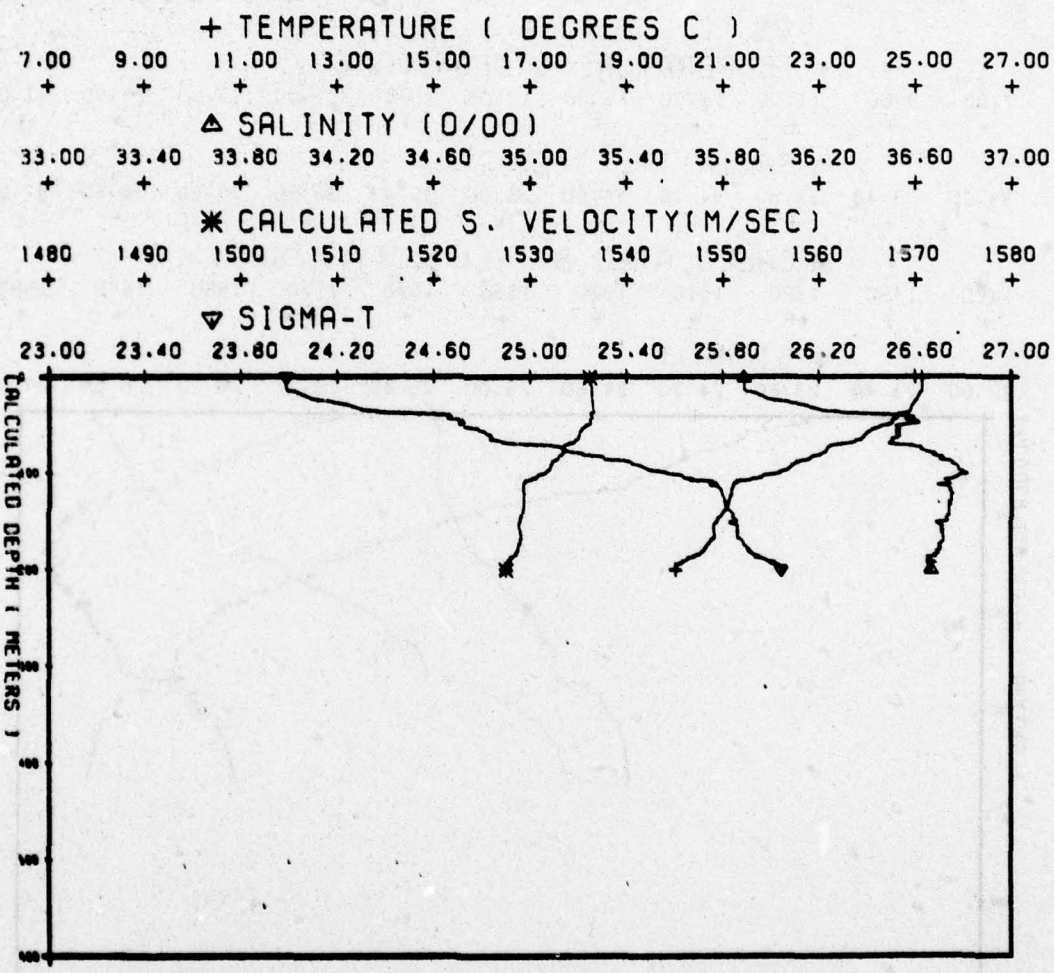
FINAL PROFILE WILKES
NAVOCEANO CRUISE 343517
STATION 002003



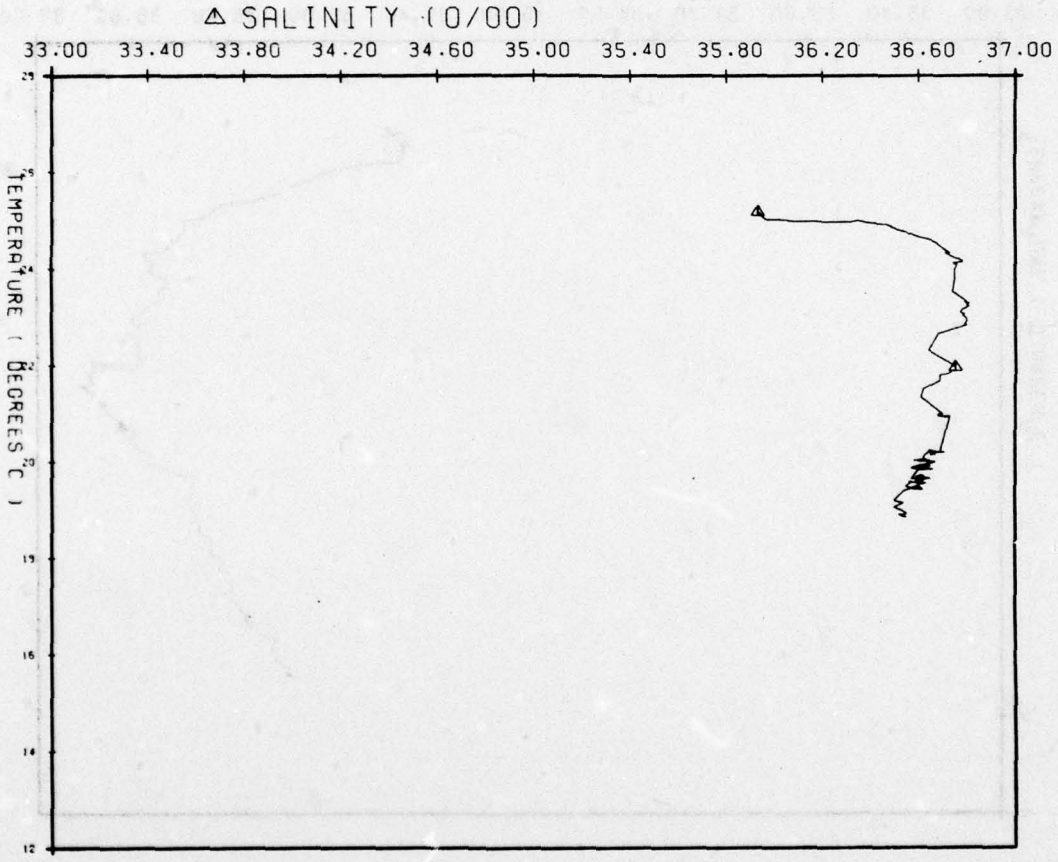
FINAL PROFILE WILKES
NAVOCEANO CRUISE 343517
STATION 003004



FINAL PROFILE WILKES
NAVOCEANO CRUISE 343517
STATION 004005



TEMPERATURE VS SALINITY
WILKES CR. 343517
STATION 005001.



TEMPERATURE VS SALINITY
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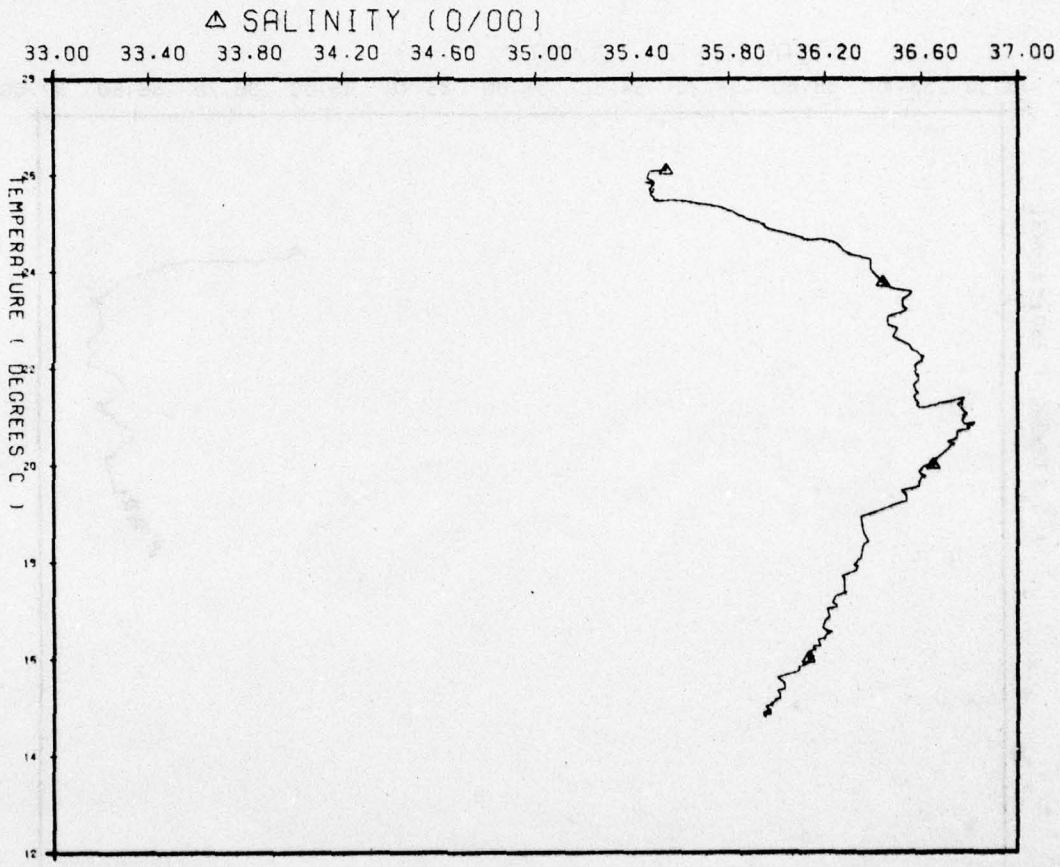

TEMPERATURE VS SALINITY
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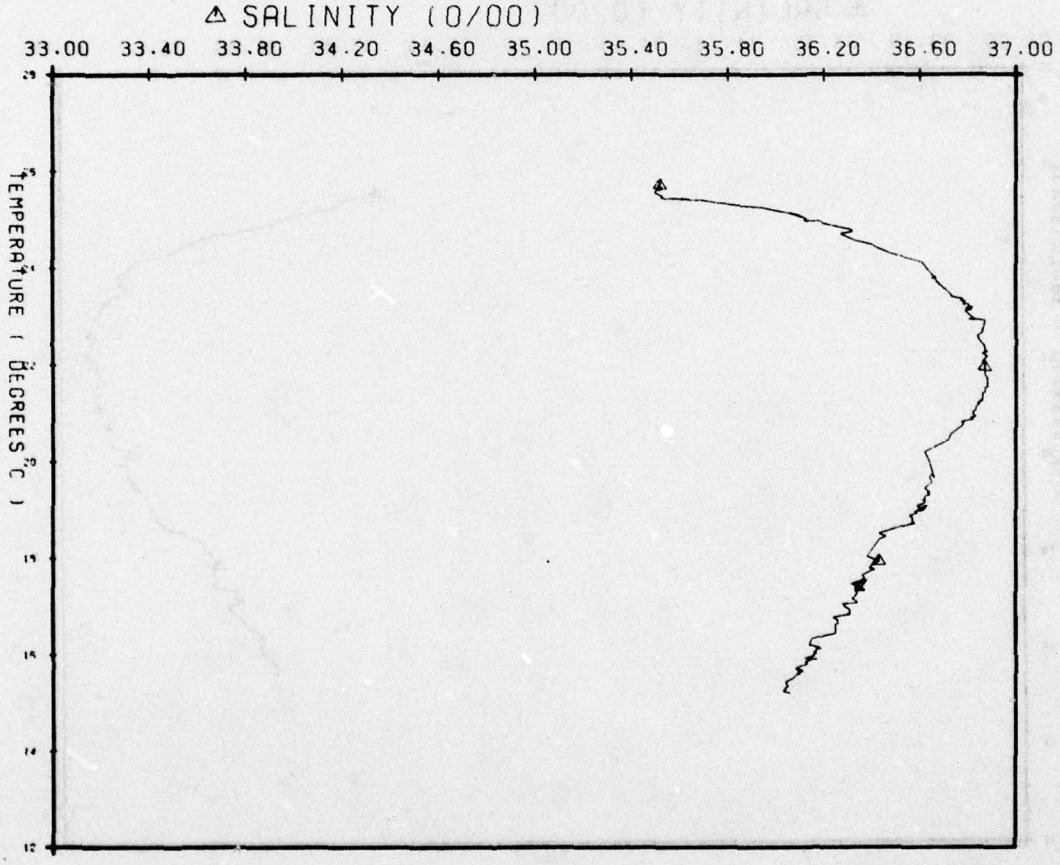

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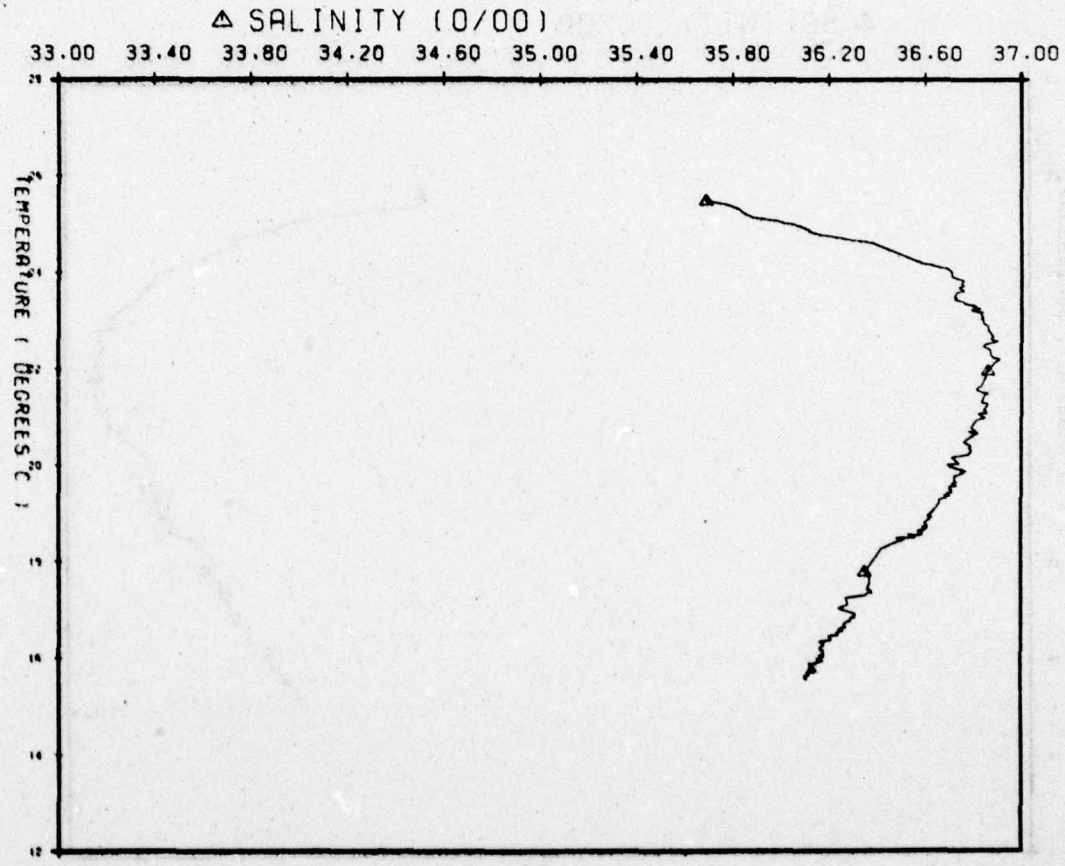

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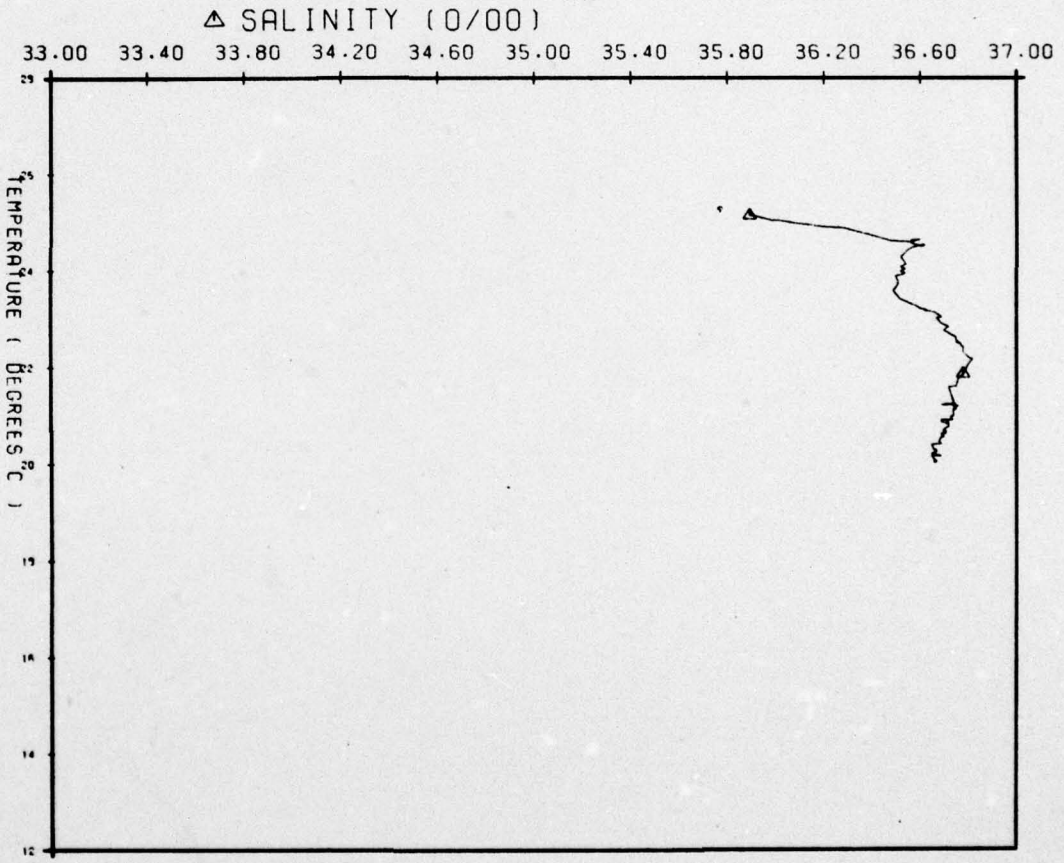

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